

Kath Jones 3536
Rory Johnston 3534
Kevin Cahill 3539
Claire Gooding 3541
Eileen Stainer 3540
Paul Fisher 3536
Donald Kennett 3536
Mike Maples 3546
Nancy Pocock 3545
John Burt 3543
Julie Cotterill 3544

Chris O'Han 3544
Ian Carter 3572
Kenia White 3571
Steve Bass 3570
David Hogan 3570

Chris Prier
Ken McLeod
Neil McNeill
Daphne Smith
Julie Hannford
Kevin McOwan
Gillian Johnson

Steve Lewis 3104
Roger Aldrey 3574
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in the UK.

COMPUTERVIEW

Ring of jargon

REMEMBER a time before you knew about computers? You probably knew about Tupperware, Delia's, and where and under what. But you didn't know about hardware and software. For many, these two words, which conveniently separate the kickable from the unkickable, still have the ring of jargon.

Computer people are undeniably in a jargon-ridden business and are sometimes forced to defend the language they use. That defence is made more difficult as some of the jargon is sensible - and some is nonsense. We should be mindful of the distinction.

Every trade and every profession has its own share of jargon, which is more or less incomprehensible to other laymen. Dentists, journalists, road crews for pop groups, computer personnel, sailors, tinkers, sailors, soldiers and spies all speak in special tongues. Otherwise-normal people go to work and then talk of hooking up a pink noise generator, or going to the galley because the proof is missing, or singing up to a breast and spring both ends, or finding an occlusal on an upper left six.

Hands up those who can say something intelligible about, for instance, a multiple head crash.

Some jargon is used so widely that it filters into everyday speech and is assimilated

in the language. The rest of it remains gobbledegook to all but the initiates. Jargon is used for two contradictory reasons. In some cases it tends to precision and in others it is a vague covering for sloppy thought.

The first reason - and unfortunately the wrong and most common reason - for using jargon is to give the appearance of significance when true significance is either being hidden, or is lacking to start with.

A fine and barbarous example of this significance-seeking came from the mouth of a Ferrari spokesman describing a computer aided design project recently. He asked: "An exactly delivered area denial system."

A bomb by any other name. In fact a particularly nasty bomb with a landmine attachment that does not explode until the area around the crater is thought to be safe.

An ongoing area denial situation, so to speak.

Such words are necessary if you want to

label something without calling up a clear mental picture of it.

Less barbarous but more widespread is the phrase "cost effective", which is endemic among people talking and hawking computers. Salespeople are told to say it instead of "cheap", providing an example of an attempt to make the insignificant pale into significance.

At a recent Infotech gathering, a bunch of managers agonised over the vile phrase eventually to decide that it meant "to service the user at the lowest possible cost under current environmental circumstances".

What's wrong with "cheap on the price"?

Other cost-effective type horrors are trade-off, state of the art, leading edge, implement, parameter, facilitate, flexible, timeframe.

The second reason why so much jargon is heard, the one which is defensible and especially pertinent to the computer industry, is that it often describes what cannot adequately be described in any other way: new

words for new things like micros, hardware and software. Our trade/profession has simply because it is so new, had to wait until given a car to look after, and even mentioned updates and specs until a word processor came along a year or so later.

Chambers' Dictionary is helpful but bears out the distinction between pretensions and the descriptive.

"Jargon, chatter, rambling, slang; artificial or barbarous language; a profession."

It is almost by way of a concession that the definition has jargon as the "proper profession". Unfortunately it is precisely sure if we are part of a profession, in an uneasy limbo between a professional and an occasional instance of being a professional.

The inaccessibility is also behind the monthing of too much jargon to stand. There is, however, a feeling of being in talking codes and being a cabal, a profession even.

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Govt and industry to collaborate on information technology

A COLLABORATIVE project to evaluate information technologies, funded jointly by government and industry, promises to be one of the first of a series of initiatives by a newly reconstituted Electronics Economic Development Committee (EDC).

The new committee met for the first time last week, as a result of the National Economic Development Council decision, eight months earlier, to set up a group to oversee the rapidly converging and developing areas of telecommunications, computing and microelectronics.

There would be no large financial handouts, though considerable help could be given through a public purchasing policy.

hampered by the absence of a positive industrial policy.

The benefits of the demonstration project are envisaged as its ability to:

- Assess market reaction and test marketing assumptions, such as price and elasticity of services;
- Prove technical feasibility;
- Stimulate development and production of systems and equipment for export markets;
- Provide information to assist public policy decision, eg UK satellite policy;
- Provide a shop window for export sales; and
- Stimulate "information providers" to supply data and services for such systems.

The most likely area for the demonstration site is one containing a high proportion of commercial users to domestic users; a high proportion of well-educated, better-off domestic users; and a dominance of high technology industry.

Initial plans had centred on the use of a 'green fields' site, where there was negligible existing infrastructure. However, it was felt now that a mature, self-contained and balanced community would provide far better marketing information.

The chief components of the project to be evaluated would be a large fibre-optic cable network, linking data based consumer electronic products, communication office equipment, and distributed data processing. Satellite communications (voice and data) would also be examined.

After the meeting Sir Henry explained that the UK electronics market had doubled in the last 10 years (adjusted for inflation) with UK manufacturing output doubling in the same period. Unfortunately import penetration had also risen, from 20% to 60%, with greatest imports being made into the computer field.

Greatest scope for government help existed in the guidance it could provide to help the industry understand the importance of co-ordinated action to evolve its own structure, emphasised Sir Henry.

One of the first hurdles of this project seems to have been cleared in that the Electronics EDC has won the support of the major companies and trade unions, both of which agree that the performance of the UK industry has been

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Balanced

One of the UK's chief problems was that no companies existed with capabilities across the whole spectrum of information technology, as was the case with such organisations as IBM and Philips, said Sir Henry. It was because of this that the committee had started to formulate plans for a joint public/private sector demonstration and evaluation scheme for advanced communications technologies.

British Telecom would obviously play a leading role in this project.

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Communications boost for IBM small systems

BINARY synchronous communications for the System 38, improved Systems Network Architecture support for applications programs on Series 1, and 3270 emulation on the 5280 distributed data system are included in the clutch of new products announced last week by IBM's General Systems Division (GSD, January 22).

The BSC support on System 38 will be available by April, 1982. It will enable the machine to communicate over telephone lines with 370, 4300 and 30XX mainframes, with Systems 3, 32, 34 and other System 38s and with the Series 1 and the 5110/5120 desk top machines. It can also link up with a variety of terminals, including the 5280, 5231, 5261 and 3741, but

not 3270 systems.

In a "statement of direction" to its customers, outlining plans for further communications capabilities for the System 38 over the next three years, IBM promised that it would add BSC Multi-Linking Remote Job Entry, BSC Multipoint Tripartite Connection, and Systems Network Architecture Remote Job Entry (SRJE), in each case in a 370, 4300 or 30XX host.

The start of SNA support for the System 38 has now been moved forward to April this year. Other new facilities for System 38 include several programmer productivity aids, incorporating a feature called Screen Design Aid (SDA), for generating application menu programs.

The improved SNA support fur

Series 1 enables applications programs under either the RPS or EDX operating systems to communicate with a CICS or IMS application on the remote host. Another new communications product is the Communications Monitor, a licensed program product that manages communications between two Series 1s, between a Series 1 and other computers, and between Series 1 and various I/O devices.

IBM has also jumped on the local "ring" bandwagon, albeit in a limited way, with the Local Communications Controller. It takes the form of a single PC card added to each Series 1 and enables up to 16 of them to be interconnected in a "ring", with full duplex transmission at up to two megabits per

second. The "ring" itself consists physically of a twin-axial cable — two co-axial cables in parallel.

IBM explains that each Series 1 can direct messages in any other Series 1 unit in the "ring" without the need for a master controlling station.

Each Series 1 can selectively broadcast to any or all of the other Series 1 units, by means of user-written code.

The 5280 distribution data system can now appear to a remote host as a 3270 controller in either a BSC or SNA environment. Operations supported include batch communications using 3270 line protocols over a BSC network, as well as interactive working under either BSC or SNSDL.

Thomson-CSF begins production of household computers

THOMSON-CSF is to begin manufacture of personal computers at retail prices ranging from £240 to £330 at its factory in Moulins, central France, at the end of 1981.

The French manufacturer says it is confident it can snatch sales from Sharp, Matsushita, Commodore and Apple thanks to its nationwide distribution network. Thomson-CSF's chairman,

Michael Wahlain, who announced the firm's entry to the household computer market, said: "Electronics for the consumer in France is going to have a name: Thomson."

Wahlain said the Thomson

models would control and program household equipment, question word-type data banks, plan home budgets and be geared to function with France's future electronic telephone directories.

Now phototypeset directly from your computer or word processor.

There's a whole world of difference between photo-set type and the print-out a computer or word processor delivers. Phototypesetting not only looks more professional. It can make significant savings in paper, postage and handling costs because the material is presented so compactly.

Now it's possible to transfer material recorded and stored on word processors and computer systems to our Compugraphic EditWriter range.

Without rekeyboarding. It's done with our new programmable interface, compatible with virtually every word processor or computer. Finding out more about our Intelligent Communications Interface is a very intelligent thing to do.

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Digi-Data sees lightness and compactness as two of the main attractions of its Model 1518 printer terminal, shown here. It weighs 42 lbs and measures 21.9 x 18.5 x 8.5 inches.

Digi-Data launches its first printer terminal

WELL-ESTABLISHED as a supplier of magnetic peripherals, Digi-Data has moved into the printer terminal manufacturing business with the launch of the 2510 series of high speed matrix printers like the Texas Instruments 820 and the Tolly T1612.

Digi-Data is seeking UK distributors for the 1510 terminals because end user sales are expected to account for a much higher proportion of shipments than with the company's tape drive and controller products. The first to be signed up is Dico Electronics of Basingstoke, best known as a supplier of systems based on the Digital Equipment LSI-11. Two more distributors are being sought.

An interesting aspect of the 1510

series is the use of simple keyboard initiated mnemonic commands for formatting features like margins and tabs, horizontal and vertical pitches and underlining.

Performance features include 150 and 200 cps printing speed achieving throughputs between 18 and 250 lpm and a maximum baud rate of 19.2K-baud. An optional extended buffer can hold a full 8K character by 25-line screen.

The 1510 family comprises two models at the moment, the 1510 KSR version which costs £1,249 and the Receive Only 2511 priced at £1,070.

Manufacture of the 1510 terminals is carried out in the US by Digi-Data itself, apart from a nine wire ballistix print head which is bought in from La Siegle.

Yorkshire Bank orders De la Rue cash dispensers

TO speed up customer service, the Yorkshire Bank Group has placed an initial order with De la Rue for 10 of its new 1320 teller assist cash dispensers. The 1320 operates in stand-alone mode and enables a cashier to dispense any mix of up to four note denominations. It also prints a record of all transactions.

The microprocessor-based 1320 can be tailored to suit the requirements of individual banks including data recording, cashier identification, customer account number recording and batch and

grand totalling of dispensers. A keyboard terminal on the counter displays messages to guide the cashier through each stage of operation.

De la Rue is well established in the cash dispenser business. It supplies mechanisms on an OEM basis to manufacturers of through-the-wall units like NCR and Debold.

Teller assist systems like the 1320 are designed to speed up the cashing of cheques by cashier.

Measuring up to DP

THE French Thomson group's TITM company has added to its activities the production and marketing of measurement data processing systems.

TITM is challenging the dominant role on the European market of the US firm, Tescada. Its target is a 100 million franc (about £24.5m) turnover by 1985. Be-

tween 25% and 30% would be derived from exports.

It sees a big market ahead for its DPMS 1000 centralised metrology system which links measuring equipment by telephone lines.

The DPMS 1000 makes possible worldwide weather forecasting by correlating a wide range of measurements from scattered sites.

GREATER MANCHESTER POLICE

POLICE W. L. 100

The Greater Manchester Police are seeking a person with the following qualifications: 1. A minimum of 10 years experience in the police force. 2. A minimum of 5 years experience in the use of firearms. 3. A minimum of 5 years experience in the use of a baton. 4. A minimum of 5 years experience in the use of a taser. 5. A minimum of 5 years experience in the use of a pepper spray. 6. A minimum of 5 years experience in the use of a gas mask. 7. A minimum of 5 years experience in the use of a helmet. 8. A minimum of 5 years experience in the use of a radio. 9. A minimum of 5 years experience in the use of a flashlight. 10. A minimum of 5 years experience in the use of a whistle. 11. A minimum of 5 years experience in the use of a siren. 12. A minimum of 5 years experience in the use of a megaphone. 13. A minimum of 5 years experience in the use of a megaphone. 14. A minimum of 5 years experience in the use of a megaphone. 15. A minimum of 5 years experience in the use of a megaphone.

MICRO NEWS

UK can learn from rivals in govt aid to electronics, says EDC

GOVERNMENT support and guidance of the UK electronics industry compares unfavourably with that given by its chief competitors — Japan, the US, France and West Germany.

At its first meeting, the restructured Economic Development Committee (EDC) for electronics agreed that there is considerable scope for changing present policy within UK industry and government. These main changes of policy are likely to be implemented in the form of co-ordinated national R&D and marketing strategies.

Japan, West Germany, France and the US all experience faster growth in the electronics industry than the UK, and, as the EDC points out, there are several striking similarities between their policies.

The key word singled out by the EDC appears to be "co-ordination". In each of the competitors' policies a single institution develops policies, assesses priorities and implements them over long periods, working closely with the industry.

Research and development is promoted by this institution, but sensibly shared out. For example, only a limited number of firms

specialise in microelectronic research. On the equipment user side, awareness is promoted. The EDC points out that the more co-ordinated this promotion is, the more effect it has.

European policies differ because up to now they have been designed to encourage existing firms within existing constraints. In particular, Japanese policies have always aimed to promote common technological targets through co-operative research.

By sharing application and use of basic technologies, the Japanese have managed to avoid intense internal competition and concentrate on competing with the US in an effort to close the technological gap.

No conflict

The Japanese have been successful in the electronics and many other industries because no conflict exists between the aims of national policy and the aims of industry. The EDC points out that Japan has a market economy rather than a "planned" economy; hence the government merely guides and assists.

The Japanese Ministry of International Trade and Industry also guides the electronics industry without funding. Its total funding

Japanese build trial GaAs computer unit

GALLIUM arsenide (GaAs) large scale integration devices have been developed by scientists of the Japanese Ministry of International Trade and Industry, using a new method which has facilitated the implementation of such devices within a trial computer unit.

The research team of the Electrotechnical Laboratory, Agency of Industrial Science and Technology, has built the trial computer unit using line geometry of three microns. It comprises 11 elements and can achieve speeds of 120 picoseconds per element with a power consumption of 10-12 milliwatts.

Unlike silicon devices, gallium arsenide elements are suited to superfast computers, because of their high operating speed and low power consumption. Up to now, application in computer systems has been limited because of manu-

facturing and development problems.

The new method developed by the research team involved the application of a special Schottky-effect junction to replace existing bulky, power-consuming Level-Shift circuitry. The gallium arsenide semiconductor used was the Normally-On type which required connections between each pair of elements to control their voltage difference.

The team considers that if the trial computer unit is taken down to one micron dimensions or less it will be possible to get down to speeds of 50 picoseconds, maybe 20 or 30, and a reduced power consumption of a few milliwatts.

An official programme to develop such a computer is planned this spring by the Ministry of International Trade and Industry.

Voice control in VLSI design

A VOICE recognition module called Harmony has been designed for use with a very large scale integrated (VLSI) circuit designing system.

US company Calma, based in the silicon valley, developed Harmony to give the user voice control of a computer system.

The voice recognition module attaches to the company's vector memory display terminal, which in turn connects to and controls the operation of Calma's Graphic Display System II, a computer aided design/manufacturing system.

Toy boom on the decline

DEMAND overtook supply in Christmas in the electronic toy and game business, but the boom is not likely to last, according to industry bodies.

From 1977 to 1978, US sales of electronic toys and games increased five times over, while from 1978 to 1979 they tripled. In the period 1979 to 1980, sales were expected to double but they have increased by only 10 to 20% to

about \$450 million. Reasons given for the decline include the recession, the novelty having worn off, and the flood of toys on the market making it difficult for consumers to choose.

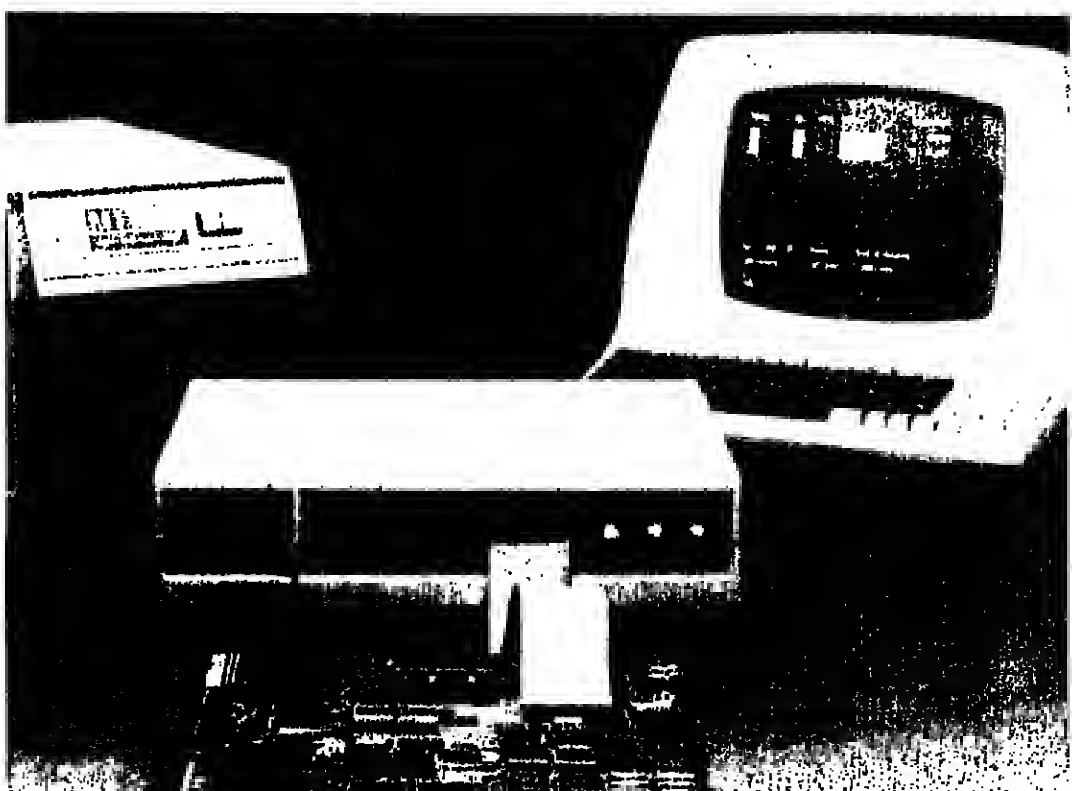
US manufacturers are already feeling the effects of the slumping market. Mattel has reported reduced profits, and Milton Bradley has had to close a year-old factory in the Caribbean.

to industry as a whole during 1980 amounted to \$2 billion.

The Ministry makes sure that new technology is bought at the lowest price possible by the most suitable company, thus ensuring an efficient policy.

The EDC indicated that the UK should be setting up co-ordinated projects involving major UK electronics companies like GEC and Plessey, in the same way as the Japanese have done both with LSI and VLSI circuits. These companies could then bear the cost of a centrally co-ordinated research team.

Representatives of electronics companies on the committee, which includes Ferranti, STC, ICL, Philips Industries, STC, ICL, Kael Electronics, Plessey, GEC, and the Post Office appear willing to take part in such an activity.



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Itel is bankrupt — but the problems still linger on...

by Hesh Weiser

ITEL CORP went to the Federal Court in San Francisco on January 19. The matter was routine, as the law goes, but it was unusual in the computer business. ITEL filed for bankruptcy under Chapter XI of the Federal Bankruptcy Act.

Itel, once the king of the computer lessors, was insolvent. With debts of \$1.6 billion and assets on its books valued at \$1.1 billion, the company faces a very difficult time. Even though present management entered bankruptcy voluntarily, hoping to use certain options under US bankruptcy laws to protect Itel as it attempts to reorganise, many difficulties make the situation uncomfortable for a large number of individuals and organisations.

The shareholders are obviously affected. So are the banks that loaned Itel money; the insurers, principally Lloyd's of London, that backed some of Itel's deals; and the users of equipment leased from Itel, who now face additional difficulties if they had hoped to return equipment under special provisions of Itel leases.

Itel's fortunes had risen rapidly during the middle of the last decade, with sales and profits peaking at nearly \$700 million and \$50 million respectively in 1978. But in 1979, in the wake of the announcement of IBM's 4300 series computers, data processing equipment in Itel's portfolio and the IBM-compatible machines it was selling became drugs on the market.

Income fell, profits turned to losses and the company's executives, for whom winning had become a way of life, turned into big losers.

Acrimony

The controversy surrounding the company will not be cleared up in the near term. Investigations and lawsuits, revisions of the company's accounts, disputes with customers, lenders and insurers, acrimony among past and present executives all make explanations of what happened elusive. But some of the facts are now known and more will emerge from the struggle that is underway.

The evidence points to bad judgment, at the very least. Computers were the cornerstone of Itel's business, which included leasing of aircraft, ships, shipping containers, railcars, just about every kind of capital

equipment that had a high price-tag. The computer business provided the cash that could be used to start other ventures, because in the beginning of each computer lease a fee for its services as packager — middleman — was added to Itel's war chest.

No matter that some of the lessor deals later had problems — as long as Itel was growing, it was turning up cash.

Debate

Impressed by Itel's seemingly golden touch, financial institutions of all sizes put money into the hands of the company's managers, expecting their funds to be returned, with interest or dividends added, and never expecting a debacle like the one that has ensued.

In addition to some \$440 million now outstanding on loans secured by assets, Itel has debts of \$860 million that are backed by nothing but the hopes of the present corporate leadership under James H. Maloon, who once ran Pan American Airways.

There are other liabilities in addition to these debts, including some \$300 million in so-called contingent liabilities, funds that might be needed for attorneys and the repair or maintenance of machinery in Itel's portfolio.

And there are reserves against the possibility that insurance on certain computer leases, most of it underwritten by Lloyd's of London, will not pay off Itel's claims in full.

In regard to that insurance, Itel said, in its recent financial reports, that it expects claims against Lloyd's policies to exceed \$300 million. Lloyd's will not comment on the validity of its claims other than to point out that Itel's estimates and those of underwriters may be the object of a difference in opinion.

Lloyd's insured the computer leases of more than a dozen other companies and expects claims payments to come to something like \$400 million.

It may be a few years before anyone knows just what the total insurance losses will be, and the public may never be informed. The losses at Lloyd's stem from a series of policies that have been labelled "Y" policies because they are written on a "Y" form. In essence, Lloyd's insured various computer leases against what the insurer perceived as the chance that computer leases for

short terms would not be renewed. The insurance was important because the financing of the lease equipment was based on long-term rentals of the equipment, whether by one party or a succession of parties.

Deals

As things turned out, many users did not elect to hold leased equipment for the full terms of their agreements. Instead, they chose to terminate their leases as provided by their contracts. When they terminated, the rentals were lower than originally anticipated, so Itel and other lessors were forced to offer extensions of the leases at very low rates in order to hold customers.

This decline in the market value of equipment led to claims against Lloyd's, which led to losses far in excess of the premiums paid for the insurance.

The insurance was the reason banks loaned money for the purchase of the computer in the first place. Under the terms of the lease, the risks involved for the lender were very great compared to those permitted under Regulation Y, a banking rule. But with insurance presumably eliminating the risk to lenders, shifting it to Lloyd's, bankers went for the kinds of deals Itel put together.

The users signed contracts, for the most part, involving termination after four of the seven years. But in the contracts were provisions that in fact obligated the lessees for the full seven years in the event Itel could not find other ways to make the machines bring in adequate revenues, or if Lloyd's, for any reason, did not pay.

Lump sum

In a sense, there were two arrangements made simultaneously. One was a clear hell-or-high-water obligation on the part of the lessee to pay off the leased computer. The other was a set of promises, insured by Lloyd's, that were supposed to relieve the initial leasee of obligations if the computer was returned.

As users have terminated, Lloyd's, Itel and the user have tried to reach realistic compromises. It is generally believed that



Itel's debts of \$860 million are backed by nothing but the hopes of the present corporate leadership under James H. Maloon (above).

half of Itel's insured leases have been brought to some state of negotiated settlement by this time.

Typically, Lloyd's will make a lump sum payment to the computer user in return for the user's signing an agreement that removes Itel and Lloyd's from any future obligation. The user's requirements to make monthly payments under the lease remain untouched. The user then ends up with the computer for the remainder of the full term, typically seven years, but with money from Lloyd's (and, less often, Itel) to partially or fully cover the cost of future payments.

Some lessees are still using these machines, while others, who have accepted the fact of their obligation, are physically keeping the machines but unplugging them to save on maintenance as they move forward from the 370 generation to newer machines. No two situations seem to be exactly the same.

Lloyd's is continuing to work with lessees of insured machines, even though there is a provision in the "Y" policy that might serve to nullify the insurer's obligation. But the tone of the discussions could well change, as Lloyd's may be acting as much out of a sense of

honour as of legal obligation these days. Itel, for its part, must come up with a reorganisation plan. It is due within 120 days of the filing of bankruptcy papers. The plan must be approved by creditors representing the majority of debt.

There are, according to Itel, some 6,000 creditors, of which some 100 are considered principal lenders. After failing to reach some accord before going bankrupt, Itel's prospects for settlement may be only a little better now.

The bankruptcy enables Itel to cease paying interest on loans — and that cost the company \$150 million in 1980. The law also blocks demands from creditors for what they think is due to them.

The company says it expects its container and railcar business to make money, thus giving Itel a chance to emerge from bankruptcy at some future date. But for now, with a negative net worth of over \$260 million, the situation is hardly inspiring of confidence.

The only note of hope at present is the attitude of determination expressed by Itel's executives. Then, again, the company had never suffered from a lack of confidence, only a lack of foresight.

NEWS IN BRIEF

Viewdata software for V77 minis

PRIVATE viewdata software run on Univac V77 series minis has been developed by London-based Detweiler Thomas, a systems house specialising in real time applications. Univac is to market the system, which is priced for £14,000 for a 16-port 10,000-line version based on a V77/200 and expandable to a 1,000-port version based on four V77/200s plugged into a V77/800.

Protocols have also been developed for the minis to frame ICL, IBM or Burroughs frames.

Australia enters VLSI stakes

THE Australian government is venturing into very large scale integrated circuit research for the first time under the direction of Craig Mudge, who heads a VLSI design team at DEC Equipment in the US.

The project, which is part of a computing research division of the Scientific and Industrial Research Organisation, is to receive a major funding from the Australian government of \$1.5 million.

EEC to use CII-HB software

UNDER a service contract between Honeywell Bull (France) and the EEC, CII-HB's Bull's Mistral software will be used in computer searches for documents by the Commission of European Communities.

The service, which has been operating with CII-HB's Mistral will in 1982 use DPS 782, to be publicly available through a contract. The target date is 1982, with only limited work in 1981.

Better NPNs

IMPROVEMENTS in performance and density of NPN bipolar transistors to suit particular US applications have been announced by IBM. Researchers at the IBM Thomas J. Watson Research Centre in Yorktown Heights, New York have developed an experimental structure using a new bipolar technology that can switch at approximately 100 picoseconds.

Printer plant

BURROUGHS is to build a 150,000 square foot centre in Orlando, Florida, for designing and manufacturing what are described as "advanced computer printer devices", including dot-matrix units. The centre will employ 20 people and is due for completion by mid-1982.

Business sats to be no cheaper than leased lines

by Donald Kennett

PRIVATELY-LEASED satellite communications links in Europe will be more expensive than all but the longest terrestrial leased lines, according to British Telecom.

Managing director Peter Benton said last week that the private satellite-based links to be offered to companies as a result of last month's Eutelsat agreement would satisfy an urgent need for links that could be expanded and redistributed rapidly, but for most purposes they would be replaced by terrestrial links with the build-up of the Integrated Services Digital Network on which System X would be based.

The first digital private circuits are to be made available during 1983 between 30 of the largest towns in the UK as each section of the digital trunk network is put into place.

The satellite links are due to start up during the same year, following commercial trials planned for this autumn using the Orbital Test Satellite which is already in space, and will be developed alongside a Europe-wide terrestrial ISDN increasingly based on optical fibres.

Offering a choice of transmission speeds up to 2Mbps, the satellite services are also seen as complementing the public packet switched services which offer speeds up to 48Kbps. The international ISDN will use cable, line-of-sight radio and both big-dish and small-dish satellite links as appropriate.

Terrestrial links are likely to predominate, since they will be more economical by the early 1990s, but if the expected growth rates are attained more satellites will be added to the five currently planned.

Two mobile earth stations have already been ordered from Ferranti for the trials this year, and between 20 and 30 are to be ordered for the full service in 1983 from Ferranti, GEC-Marconi and Plessey at a cost of about £5 million. The satellites themselves are expected to cost £50 million, including the capacity leased from the French satellite Telecom 1, and British Telecom's share of the costs will be £8 million.

'Unlimited' teleconferencing system on show in UK

STANDARD Telephones and Cables has run demonstrations this week designed to convince British Telecom and UK telecommunications managers of the usefulness of a 10-year-old teleconferencing system made in the US, which is claimed to be able to handle a virtually unlimited number of participants.

Equipment now used by British Telecom is limited to eight stations inland and five internationally, while STC plans to demonstrate a 20-station international conference from its Ex-



BENTON: British Telecom played a leading role in harmonising the European approach to small-dish services.

cluding the capacity leased from the French satellite Telecom 1, and British Telecom's share of the costs will be £8 million.

Tariffs will be independent of distance. They have yet to be finalised, but will vary with transmission speed, whether the link is full-time or part-time and whether the capacity is pre-assigned or taken at short notice.

Talks are under way with five or six potential customers and a user group is to be set up soon, but they find it hard to investigate applications without knowing the tariffs, while British Telecom finds it hard to set tariffs with no estimate of usage.

British Telecom aims to provide as great a variety of options as possible and to respond quickly to the way customers see their needs.

British Telecom claims to have made a major contribution to harmony among the 19 members of Eutelsat, who last year were split between the European Communications Satellite Programme, which was to supply trunk line capacity via large-dish (15 metre) antennae to PTTs only, and

field, Middlesbrough, etc.

British Telecom has given approval for operation of the system on leased lines and is expected to add switched network approval shortly.

Made in the US by Dairmont of Harvard, Illinois, the system consists of a conference bridge called the Meet-Me and a conference terminal for each site called the Convener, to which microphones and other devices such as the Telebots telewriter and slow-scan television systems can be attached.

Burroughs \$68m loss

From front page

Delivery backlog was at an all-time high.

Blumenthal said the drop in profits related to restructuring and basically represented a "deferral of revenue to future periods."

He explained that the "backlog of sales had been slowed by a change in delivery strategy which involved putting machines into local "staging areas" for assembly and test before delivery. The staging areas are one of the company's measures to improve service and support which Blumenthal recog-

nised as Burroughs' biggest problem area.

Blumenthal hinted that Burroughs had expansion plans for West Germany, a market where the company has a relatively minor presence compared with most of the other major computer firms. He also mentioned plans to build a factory in Japan.

Blumenthal suggested that Burroughs would be making acquisitions in the small systems and automated office areas, but was not committed as yet. He revealed that two new 900 series machines were coming soon.



Two mobile earth stations have been ordered from Ferranti for commercial tests this autumn.

IBM services now available from Scicon

IBM users are now offered APL, PL/I, Cobiol and Fortran facilities by Scicon Computer Services. The Milton Keynes bureau has installed an IBM 4341 operating under VM/CMS and VSI which can be accessed where possible via the network that serves Scicon's well-established and very extensive Univac 1100-based bureau operation.

The IBM services will include local and remote batch as well as interactive facilities.

The two-megabyte 4341 was originally intended to run the Infoline information retrieval service on behalf of Pergamon Press. Pergamon bought Infoline from its previous owners, which included

the Department of Industry, after they had spent up to £600,000 of public money on an unsuccessful retrieval software development (CW, July 3). But the deal between Scicon and Pergamon fell through in November. According to Scicon, this was mainly because of Pergamon's tardiness in selecting new retrieval software.

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WEDNESDAY 11 MARCH

Keynote Address:
Chairman: Howard Kornblum, Intel, UK
Local area networks — a merger of computer and communications technologies
O C Bass, Vice President, Unicom Systems, USA
Disseminated Processing:
Chairman: Andrew Collin, University of Strathclyde, UK
Microprocessors in a distributed processing network
P M Jackson, Modular Systems Systems, UK
Disseminated processing — the role of the intelligent peripheral
O Dunlop, Zilog, UK
An approach to special purpose imaging/microprocessor systems
G J Whitfield, Royal Military College of Science, UK
Development Systems:
Chairman: David Dool, Hewlett-Packard, UK
A low cost self contained support system for the Intel 8020
T Warrle, A Karm's O J Quarmby, Loughborough University of Technology, UK
The MICRO development facility:
R A Vignall, RPL International Research Centre, UK
The design of a universal microprocessor development and design
R D Green, Alexander Computer Systems, UK
O Duffell, British Computer Systems, UK
Chairman: David Dool, Hewlett-Packard, UK
Choosing languages for real-time embedded microprocessor systems
R Foulkes, National Computing Centre, UK
Developing FORTRAN programs for microcomputers
C Quince, Systems, UK
The use of microcomputers in the software bus
D Poye-Lynn, IMA, UK

Case Studies:
Chairman: Andrew Collin, University of Strathclyde, UK
A microprocessor-based system for international pressure recording
R Chamberlain, Newcastle General Hospital, UK
System design of a data acquisition unit for microprocessor systems
M J Taylor, University of Liverpool, UK
Control data handling of a satellite navigation system
R E Peacock, O K Day, J Ford & C J Kelly, Camfield Institute of Technology, UK
Training:
Chairman: Andrew Collin, University of Strathclyde, UK
A self-training course in microprocessor based product design
W S Hilderson & C A Hilderson, Oram University, UK
A microprocessor learning system
A Singer, ESI International, USA
The use of microcomputers in schools
J J Tansbury, National Computing Centre, UK

FRIDAY 13 MARCH

Personal Computing:
Chairman: Julian Allison
Trends in personal computing
Conrad Boydell, Kent State University, Regional Computer Centre, Bath University
A review of the latest hardware and software developments
Microcomputers for the businessman
Mike Hughes, Selwyns & Partners
Guidelines for the businessman planning to "go it alone" with a micro
Schofield and Technical use of microcomputers
Mike Fisher, Research Machines Limited
The micro in having a growing impact on the research laboratory
Microcomputers and the Professional
John Devaux, British Medical Association
The professional associations and the micro: a new role in acquiring the use of micro
Setting up a school computing department
Mike Stevens, Royal Grammar School, Guildford
Guidelines on curriculum development and teacher training
Computer aided learning — a national project
Dr David Lumsden, Institute for Educational Technology, Surrey
University
Microcomputers: the cost of computer aided learning
Mike Stevens, Royal Grammar School, Guildford
Microcomputers: the cost of computer aided learning
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Shorthand speech translation

From front page

puter with 120K-bytes of main memory — 40K for the translation software and the remainder for holding some of the vocabulary of 85,000 English words with which the Palantype syllables were matched. The system also used a 10-megabyte Winchester disc drive to store the vocabulary.

The Conqombo machine was linked online to the Digital Equipment Corporation PDP-11/40 system that hosts the Geafax and the DEC machine inserted the syllables on to Ceefax page 270. The keyboard operator, an expert Palantype user, was under great stress for much of the 20-minute speech, according to Bill Hawkins. She had to key in words spoken at up to 180 a minute. With Palantype, shorthand, syllables set entered by striking seven keys simultaneously like a chord on a piano. There are 29 keys on the keyboard.

only one point of insecurity with current Palantype transcription systems. London, Thomas, who leads the development team at the Leicester Polytechnic computer science department, pointed out that errors were also caused by the fact that word boundaries are not indicated in the string of syllables and sometimes by the absence of a proper name in the dictionary. In the latter case, however, the output of syllables often makes the name obvious.

Competing

During his address, President Reagan mentioned the US State Dictionary, which was now in the dictionary. But it came out on Ceefax as O.M.A.H.A.

techniques were to become widely adopted.

A competing system under development at Southampton University for use with the BA0000 Teletext system placed emphasis on a "large dictionary" rather than on a "large vocabulary" of syllables. It is a "large dictionary" that is the key to the system, according to the project leader, Dr John Blumenthal, who is now at Southampton.

London, Thomas said that the Leicester system could be enhanced with grammatical facilities and with the capability to insert words using subsequence input. The resulting higher quality could make its use in an environment practicable, especially if the Palantype system is processed in batch mode rather than in real time.

Hoskyns beats the recession

HOSKYN'S GROUP, the company founded by John Hoskyns, now the Prime Minister's adviser on strategy, reports turnover for the year ended October, 1980 up nearly 50%, from £12,096,697 to £17,686,624. Profit is up from £643,000 pre-tax in 1978-79 to £1,151,000.

Hoskyns, now part of Marlin Marjette Data Systems, claims that much of the improvement is a pay-

off from R&D investment in previous years, but an analysis of the company's pre-tax profits against turnover shows that the profit margin has moved from 5.32% last year, to 7.09% this year, still almost a percentage point below the industry median for last year (7.49%).

Jim Feeney, managing director of Hoskyns, attributes much of the

improvement in profit to the strength of sterling.

Unlike many other companies reporting recently, Feeney makes no formal complaint about higher interest rates which have cost the company £103,000 this year, against £20,000 last year.

According to the company, the worst of the recession appears to be over and Hoskyns is going into 1981 with one of the strongest order books yet.



FEENEY

CGS spreads its wings with big US consultancy

FRENCH software giant Cap Gemini Societ  has acquired a firm footing in the US with the purchase of Milwaukee-based D&S Corp. The move follows last week's expansion into the Norwegian market with the acquisition of Data Logic (CW, Jan 22).

At the same time CGS has brokered off the long-standing licensing agreement with the US software products firm ADR so that it can concentrate on its own product lines.

Since the licence still had two years to run, ADR has acquired Cap Gemini Societ , part of the CGS group, as its outlet in France, to be called Applied Data Research, France.

CGS results this year mean that the company can afford to grow, especially on foreign ground. "What D&S can give us is a wide network of branches in the US," explained CGS chairman Philippe Dreyfus. "Also its business is essentially in the private sector - industry, banking and commerce - whereas our work in the US up to now has been in the public sector."

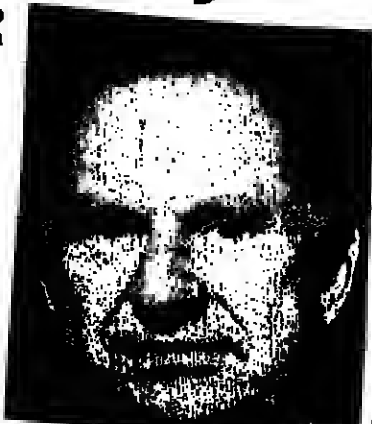
CGS already has an office in Washington of some 30 consultants concentrating on federal and administrative projects. "It takes a long time to grow abroad when you are based on home ground," said Dreyfus. "As it is now we have a ready-made force of 500. We could have waited 10 years to grow from 30-strong to that size."

A new branch of Cap Gemini Societ  is opening in Boston to sell products.

D&S, one of the most prestigious consultancy operations in the US, was ranked second after IBM in a recent brand preference study conducted by Datamation.

The D&S Corp employees about 500 people across the US, with the majority of its offices concentrated in the Eastern seaboard and in the Midwest.

With total revenues last year of \$22.5 million and profits of



DREYFUS... "D&S can give us a wide network of branches in US."

\$900,000 the acquisition of D&S will provide a substantial addition to revenue and profit for the CGS group.

With D&S, CAP Gemini acquires a range of software packages including program conversion specialists, one of D&S's software specialisations.

No price was quoted for the D&S acquisition, but about \$10 million would be in line with the price Seicon paid for System Control recently.

The move away from ADR is linked with CGS wider ambitions. "For 10 years we have been acting as a sales outlet for US products," said Dreyfus, "and it means that we put a great deal of management and sales effort into selling products that contribute little to our income, and nothing to our own technical development."

CGS will be exporting its own software and what it calls "hard-computerised" aid for its new grammar, SIP, Products include the IBM-based software SYSPRO, an automatic text composer, A-DOC, and its portable high level language, developed along the same lines as CAP's MicroCobol but based on a subset of PL/I.

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ICL, Fujitsu fight it out Down Under

THE Australian computer market, once the exclusive preserve of ICL, is now the scene of a major confrontation between that company and Japanese giant Fujitsu.

Fujitsu has beaten ICL to the post for a series of Australian public authority open tender contracts.

The battle for the mainframe business is expected to move to Europe this year and the trading results for the two companies in Australia last year clearly show how the battle has gone.

First, the ICL results: For the year ended September 1980 International Computers (Australia) Pty reported a profit of A\$137,129, against a loss of A\$160,894 the previous year. Turnover was up 48% to A\$67.5 million from just under A\$50 million in 1979.

Stan Owens, head of ICL's

operation in Australia, said the return to profit was achieved despite a loss in foreign exchange of A\$1.74 million. This compares with a loss in 1979 of over A\$4 million on currency transactions.

Owens observed that the strength of sterling had added appreciably to product costs. However, the company ended the year with a record order book, including the first 296 sale.

In the consolidated report for the ICL group the Australian figures are hidden in the turnover for the Australia and Asia region. On this basis the Australian operation contributes just under 50% of the turnover for an area which takes in New Zealand, Hong Kong, Malaysia, India, Singapore and agencies and dealers in most of the other countries of the region.

Australian subsidiary's turnover up 550%

FASCOM (Australia) Pty, the Fujitsu marketing subsidiary in Australia reported a 550% increase in turnover, from A\$8,000,000 in 1978/79 to A\$43,000,000 far 1979/80. The company has moved into profit for the first time since setting up in Australia in 1972, with a modest A\$10,000 profit for 1979/80, against a loss of A\$4,000,000 in 1978/79 and accumulated losses of A\$13,000,000 since starting up.

The spectacular turnaround was achieved primarily through the successful selling of 21 of its medium-sized F model systems, the equivalent of the IBM 4300 and the ICL 2900 series.

The company appears to have achieved a major breakthrough at the upper end of the market where it sold an Amdahl V7B to Esso

Australia. Fascom also captured the plum of the Australian computer market last year when it sold to the Bureau of Statistics two M200 machines worth a total of A\$9.5 million.

According to the company it sold its machines in 11 out of 17 open bids where the user changed supplier.

According to Mike Roydon, Fascom managing director, the company increased its staff over the year from 150 to 260, giving gross sales per employee of A\$165,000. This is substantially better than many companies operating in the UK achieve. The median figure for computer companies in the UK last year was £20,000, about A\$40,000. ICL had a turnover of £21,600 per employee in 1980.

COMPANY COMMENT

THE results of ICL Australia and of Fujitsu's marketing subsidiary there, make sombre reading.

Fascom has increased its market share substantially, primarily at the expense of ICL, though obviously not without incurring losses on IBM.

Fujitsu may be using Australia as a significant market in which to test and run its large and medium-sized mainframes.

Although Fujitsu likes to stress the facilities available on its machines, the real battle is based on price. For any given machine it is estimated that Fujitsu will provide a system of similar power for about one-third of the IBM or ICL price.

The price paid by the Bureau of Statistics for its two M200s at £4 million looks about £1 million less than the fully set up cost of two ICL 2980s.

Honeywell profits up \$33 million

HONEYWELL has reported record profits and turnover for the year just ended. Turnover was up 10% to \$4,225 billion from \$3,815 billion in 1979. Profit for the year was \$228.5 million against \$260.5 million in 1979. Revenues from the company's computer division was \$1,634 billion against \$1,453 billion in 1979.

The company benefited from changes in the final days of the year. In the final days of the year, the company's computer division was \$1,634 billion against \$1,453 billion in 1979.

In Europe, Honeywell got together with GSA to form a joint telecommunications marketing operation in the UK and Canada.

In Holland it joined Philips NV to establish a joint medical electronics company which is expected to be operational by March.

Ed Spencer, Honeywell chairman, was generally more optimistic than many of the chief executives reporting recently.

He said he was "cautiously optimistic" about Honeywell's business in 1981 and "extremely optimistic" about the company's prospects for the rest of the decade.

Logabax hires 20 more dealers

WITH its French parent company just saved from bankruptcy (CW, December 11, 1980) Logabax in the UK has announced that it is doubling its external sales network by hiring an additional 20 dealers. They will handle the firm's small business system range.

To reinforce its dealer network, Logabax is also setting up four dealer support teams to cover the whole of the UK and the Irish Republic.

The existing 15 dealers selling the Logabax LX2000 small business system and LX500 personal computer accounted for almost 35% of Logabax's turnover for the products during 1980.

The rescue operation for Logabax in France has involved major injections of cash, including about £12 million from Bletrobel of Belgium, which has increased its controlling share in the firm to 90%.

Two other sources which have already contributed about £2½ million, and are each expected to add a similar amount in the spring, are the French nationalised banks and the government investment body, CILAS.

Another £2½ million is being put in by the group set up early in 1980 to take over Logabax. The three members are banking giant Soci t  G n rale, aviation conglomerate Marcel Dassault, and Dassault's computer and electronics side, Intertechnique, which leads the group.

After going off the idea of a Logabax acquisition late last year and so plunging the company into crisis, Intertechnique finally agreed,

as a prerequisite for the plan, to pay £11 million to a 65% holding in the software and peripherals, microfilm. The one big condition was that Logabax should perform better this year than in 1980.

Interbel is keen to do it. Its majority interest in Logabax is held by the French government. The Logabax manufacturing operation in France seen as a means to improve the company's image, which has not materialised.

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Results were disappointing, though. The sheer ponderousness of the task, to program even an outline figure, was not realised, and styles were wooden and predictable - which was perhaps predictable.

The situation today, just as full of possibilities, is more realistic, with the computer used as the tool of a creative human. Given the decreasing costs of hardware and increasingly easy-to-use software, computer art is booming among film-makers, composers, and artists.

Prices will stay 'soft'

INTEL, the world's largest microprocessor chip producer, announced turnover for the year ended December 31 up 29% to \$661 million in 1979, to \$861 million in 1980. Profit rose 38% to \$77 million from \$56 million.

In the fourth quarter there was a slight drop in profit compared with the earlier part of the year. Gordon E. Moore, the chairman, said there was a price decline in the second half of the year, and he expects prices to stay "soft" until the next year.

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PROGRAMMERS' PAGE

Computers find a role in films, music and art

by Pamela Rowe

COMPUTER printout as an art form is not something that crisscrosses all the time in your average general ledger system, but Art is a wide field and has ranged from mobiles made from paperclips to bicycle tracks across virgin paper. So harnessing the ubiquitous computer to the Cause is, dare I say it, logical enough.

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The Computer Arts Society was formed in 1968 as a specialist group within the British Computer Society. It aims to encourage the creative use of computers and has a worldwide membership of 600, with 300 in the UK and the remainder divided about equally between the US and the world. Besides the London branch in Russell Square there are two others, in Paris, and in Michigan.

Secretary of CAS, John Lansdown, explained to me that the major artistic contribution of the computer is to graphics and electronic music. Computer generated graphics are used extensively in animation, for films and commercials - indeed, it has now become so expensive to produce hand-drawn cartoons that 20% of all animation in the US is carried out via the computer.

"Given enough money," he said, "any image can be synthesised."

One artist at present in the US is Terry Longson on a Bicentennial Arts Fellowship in California. He has used computers in his work since 1973 and specialises in three-dimensional shapes made of images printed on layers of clear perspex. As the viewer moves, the shapes change and evolve into different forms - Longson describes them as "drawings in space."

Planets: He is also fascinated by pictures of planets, and his fellowship fortunately takes him to the Jet Propulsion Laboratory in Pasadena. Here computers fabricate pictures, composed of an array of tiny units, from signals sent back by space vehicles. Each unit can be defined by colour, size, etc, and controlled in the final image. Longson has had several exhibitions, including two in the US in 1979, and one last year in Oxford.

Working in Britain, on a Science Research grant at Leicester, Polytechnic, are Ernest Edmonds and Stephen Scrivenner.

They have been experimenting with faster images which not only

offer such advantages as colours, solids and grey scales, but also describe the image as a matrix of points, each with a particular value, that can be stored in a special section of memory. Writing to the memory reproduces the image, while reading allows inspection.

The plus factor of the matrix system is that the image maps directly so to its representation: the computer in effect "looks at" the image on the screen.

In the more conventional vector system the image is held as a list of vector points, so is only a representation of an abstract structure. The user, at one step removed, does not have direct access to the image but must learn to manipulate the abstract in effect the representation.

Two of the graphics are illustrated, showing a man with and without his hat. The hat can be removed with an ERASE command, stored actually on the edge of the screen, and recovered with a COPY. A cursor used in conjunction with FILL would block in any desired part of him, and can be stopped when his flesh becomes that bit too solid.

Edmonds and Scrivenner are now turning their attention to matching human and machine perceptions. They aim to write procedures that will translate the perspective inherent in two-dimensional pictures, into new images, taking into account the figure/ground relationships of the original.

Another "artist" concerned with perception and perspective is Dr Chris French of UMIST, Manchester. He made a fairly light-hearted investigation into "whether computer art is a load of quasi-spherical objects." He was set rolling by an Alan Parkin article on computer plotting of illuminated balls, given details of size, position and direction of illumination. Chris French bounced up one better by rewriting the routine in Fortran-IV, and modifying the light to a point instead of a parallel source - it gives a more artistic effect.

Some of his effects are illustrated. The centre-piece shows a helix of balls turned around to expose the central tunnel. Bottom right, another double helix of balls is printed to overlap each other's positions in space.

Chris French believes that computers will take over from the spray-can and graffiti-covered wall, as the time honoured tool for expressing creativity. They will soon be within the reach of everyone's pocket, he says, and are slightly more socially acceptable as a medium.

Harmonics: In music the computer plays its part in two ways. It can be used to aid composition by controlling synthesis and harmonics, or as a device to produce sounds directly. Control is practised mostly in UK and Europe, while production is more common in the US.

The internationally known composer, Kenneth Scharf, produces sounds of any pitch, sound, by using the computer to calculate the probabilities of harmonics. Benno Arman, the notable Swiss conductor and composer, turned to electronic music in his Sixties after a distinguished lifetime in music, and has collaborated with universities in Europe and America.

Top right of the montage is an excerpt from his "Splendeurs Nocturnes" produced in 1975/76 using a PDP-15. Arman, by the way, is a composer of 12 phases constituting the 12 steps of a "Principal Curve." Each phrase

is linked by a glissando and staircase curve, produced and controlled by the PDP-15. The piece culminates in five levels of sound descending from the high pitched continuous tone of the Principal Curve, to the calmer lower notes of the glissando and staircase.

One of the most significant contributions to computer music has been made by the British-based Electronic Music Studios. Besides carrying off the first prize in 1975 for the world's best computer music program, with "Musys," they have a whole list of achievements dating back to 1967.

Musys is a series of programs designed to process sounds, dealing with scientific as well as musical aspects. It was written mainly in Fortran by Alan Sutcliffe, though Peter Grogan wrote the compiler.

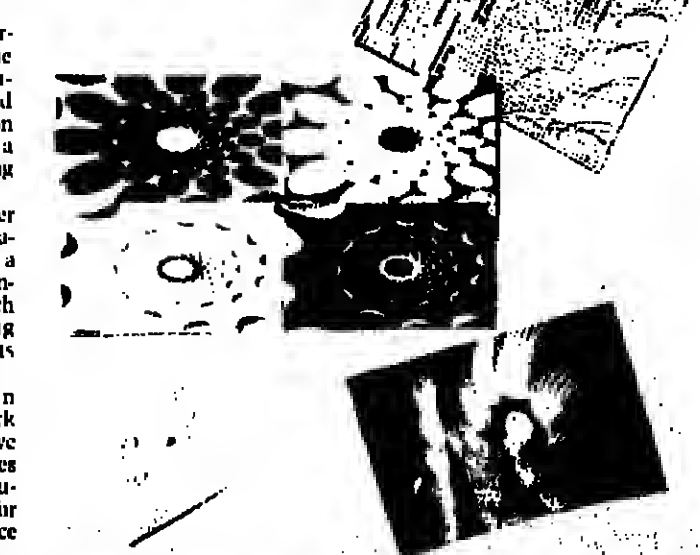
A forthcoming week of seminars and concerts on the theme of "The

Computer and the Computer" arranged for February 17-21, has the sponsor IRCAM calling for computer compositions. It is planned to mix discussions on composition with two sets of concerts and a presentation of tape-works giving an overview of computer music.

To spread the word and further its aims, CAS produces a magazine, Page, issued four times a year, and holds meetings in London on the first Monday of each month. Membership, running from January to December, costs £4 and includes copies of Page.

Each year CAS elects an honorary life member, to mark outstanding services to creative computing. Last year it was James Blinn, who produced the computer simulations and animations for Voyager and the Jupiter Space project.

Computer art and music are setting in well. All that's needed now is the best-seller.



Examples of computer generated art include graphics for animation sequences, printout of data defined chains of balls, and part of an electronic music score.

For around £20K, you could have any of the many 16-bit computers on the market.

For around £20K, you could have only one 32-bit computer. Ours.

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integrated as a component within a system or a product.

There is no 32-bit computer to touch it for price and compactness. There is no 16-bit computer to touch it for performance.

When you think about it, it can be the only choice. Build your systems with our systems for a better tomorrow.

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How many ops are to the manner born?

WERE you born to be an operator — or did you just become one? It may be misleading to put the alternative as starkly as that. After all you probably have the kind of abilities which suit the way you earn your money — and if you haven't it's time to avoid an ulcer and collect your cards.

But which way does the balance tip? Is there something ingrained in you which particularly suits your way of life, or did you stumble to your present eminence through your own efforts plus the movement of time and chance?

be or she walks into the room. It's been done and is a method of judging how people react to a surprise. More definite than that, it's an infallible way of seeing how they'll behave when a chair is thrown at them.

A more measured aid to selection, favoured throughout DP, is the aptitude test. The approach of such tests usually equates to the kind of things candidates will be doing, but the essence of the aptitude test is that, like the

Having determined the "structure" of a person, "it describes the mentality of the person in general terms so that inferences can be made, not only of the person's likelihood of success in a very large number of jobs, but also of his expected mode of behaviour in a wide variety of real life situations".

So, short of saying what colour shoes you'll be wearing on Wednesday, the test claims to predict

in a thousand people completes the test without a mistake.

A high success rate is meant to measure the capacity to learn by understanding as distinct from the ability to learn by memory.

Operators who have been persuaded they are thickos should take heart from the assessment that a score of four on the Compound Series Test indicates sufficient intellectual mettle to be a university graduate. A score of ten

Fig 3: An EIT survey of 300 clients provides the substance of these percentages.

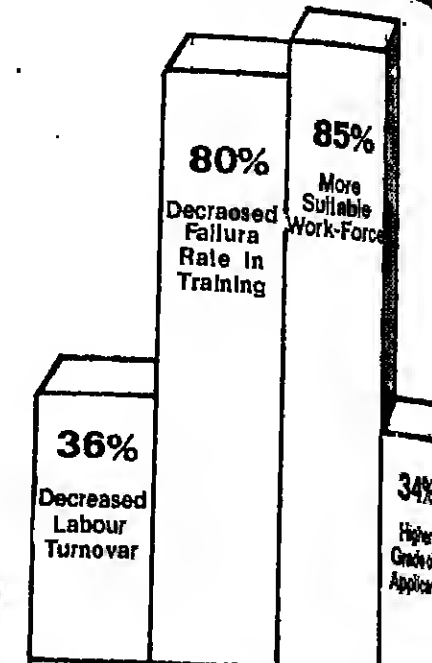


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Arbitrary

For example, if a significant proportion of psychiatrists happened to have an aptitude for leapfrog or tiddlywinks or whatever else you care to think of, then skill in leapfrogging or tiddlywinking would be acceptable predictors for aspiring psychiatrists. "O" levels and "A" levels are just about as arbitrary.

The important thing about all selection techniques is their predictive value.

Methods which reduce the frustration and uncertainty of job hunting obviously have a lot to recommend them. A method which delivers made-to-measure workers whose behaviour is by and large predictable, has immense attractions, especially for employers.

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Mary Morriaby, whose husband devised the tests, says that not one

is deemed necessary to become an op.

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Most important, EIT has grasped the nettle of cultural bias and a dependence on socially acquired skills. The company even claims that the test can be used on "primitive people". Presumably whole tribes can be lined up in their mud huts or huddled into a wadi to be tested.

Following the understanding memory test are three general ability tests covering verbal, numerical and perceptual skills. Results from these are designed to be used as a matched trio determining suitability to one career or another. For example a "biological science profile" shows a person to be "suited to medicine, dentistry, some types of nursing, zoology and agriculture".

If a test like this is accepted as a predictor then, says Harrington, "it gives us significant control".

The issue of control is explosive, as Harrington is quick to acknowledge. "What we have here," he says, "is a loaded gun."

However, before anyone gets hot under the collar about control, the validity of the test must be determined.

Validity in this case is a two-specter animal. There is academic validity based on statistics and close scrutiny, and the rule of thumb "I've seen it work" kind of validity.

Mary Morriaby, a psychologist by training, knows that the "problem of getting statistical figures is great".

She continues: "Validity figures can be misleading because people tend to use precise techniques on those data."

The only validation work referred to in the brochures describing the tests is summed up in Fig 3. The histogram is "based on the findings of 300 industrial organisations".

It is true that exhaustive statistical analysis is a large task, but the pragmatic validity test would represent a total cop-out to an academic psychologist working to a tighter frame of reference. The data for such a validation check must be available because the test was completed in 1955 and is set by something like 15,000 people every year.

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Following the understanding memory test are three general ability tests covering verbal, numerical and perceptual skills. Results from these are designed to be used as a matched trio determining suitability to one career or another. For example a "biological science profile" shows a person to be "suited to medicine, dentistry, some types of nursing, zoology and agriculture".

If a test like this is accepted as a predictor then, says Harrington, "it gives us significant control".

The issue of control is explosive, as Harrington is quick to acknowledge. "What we have here," he says, "is a loaded gun."

However, before anyone gets hot under the collar about control, the validity of the test must be determined.

Validity in this case is a two-specter animal. There is academic validity based on statistics and close scrutiny, and the rule of thumb "I've seen it work" kind of validity.

Mary Morriaby, a psychologist by training, knows that the "problem of getting statistical figures is great".

She continues: "Validity figures can be misleading because people tend to use precise techniques on those data."

The only validation work referred to in the brochures describing the tests is summed up in Fig 3. The histogram is "based on the findings of 300 industrial organisations".

It is true that exhaustive statistical analysis is a large task, but the pragmatic validity test would represent a total cop-out to an academic psychologist working to a tighter frame of reference. The data for such a validation check must be available because the test was completed in 1955 and is set by something like 15,000 people every year.

It is also useful for those 15,000 people per year.

Harrington says that at Burger they wouldn't be anyone on the line of control but this is done when they decide. "It's a very simple test," he says. "The test is to appear

in a thousand people completes the test without a mistake.

A high success rate is meant to measure the capacity to learn by understanding as distinct from the ability to learn by memory.

Operators who have been persuaded they are thickos should take heart from the assessment that a score of four on the Compound Series Test indicates sufficient intellectual mettle to be a university graduate. A score of ten

Fig 3: An EIT survey of 300 clients provides the substance of these percentages.

Fig 1: Completion of chains like this, which was originally orange and purple, is the first part of the Morriaby Differential Test Battery.

chair throwing, it can be entirely arbitrary. The value of an aptitude test lies in its trustworthiness as a predictor.

For example, if a significant proportion of psychiatrists happened to have an aptitude for leapfrog or tiddlywinks or whatever else you care to think of, then skill in leapfrogging or tiddlywinking would be acceptable predictors for aspiring psychiatrists. "O" levels and "A" levels are just about as arbitrary.

The important thing about all selection techniques is their predictive value.

Methods which reduce the frustration and uncertainty of job hunting obviously have a lot to recommend them. A method which delivers made-to-measure workers whose behaviour is by and large predictable, has immense attractions, especially for employers.

The Morriaby Differential Test Battery claims to be such a method. According to the company which owns the test, Educational and Industrial Test Services (EITS) of Hemet, Hampstead, the test gives "a complete statement in objective terms of the intellectual and 'modal' (personality) structure of the person."

Mary Morriaby, whose husband devised the tests, says that not one

is deemed necessary to become an op.

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Entries are now open for Computastars 1981 — and for the Computatug special

Sponsored by Computer Weekly and Wright Air Conditioning

COMPUTASTARS is back on the road... The time has come again for sportsmen and women from the computer industry to don their

trackuits and test their skills and stamina in an effort to find the best all-round teams from the UK and Holland.

As with previous Computastars, individual talent will be given recognition and to provide flexibility within the competition at regional heats and finals, events may vary.

First UK heat will be for the Midlands region in Birmingham on April 25. The Southern heat will be held in Barnet on May 16 and the North gets its turn in Cleekeston on June 6.

Finals will be in July at a date and venue yet to be announced. European finals, in which the top

three men's and women's teams will take part, will be in Holland in September.

Companies may enter one men's or one women's team or both, although additional teams may be entered in other regional heats. Acceptance of teams per region will be limited to 35 teams per heat, so it's first come, first served.

Closing date for entries is February 28 and the entry fee is £25 per team.

At the foot of the page there are two entry forms. The first is for Computastars, the second for this year's special tug-of-war event.

Computastars is sponsored by Computer Weekly and Wright Air Conditioning.

DON'T CALL US.....

COMPUTASTARS is a popular event and consequently attracts many enquiries. If you have a query, please don't contact us at Computer Weekly — get in touch with the staff at Computastars, 117b High Street, Croydon, Telephone 01-688 6690.

Only the strong need apply

By way of a change, an additional competition is being held this year, the Computatug. An opportunity to prove superstrength, this tug-of-war is open both to teams of five men and teams of five women, but not to those competing in Computastars. Cost is £5 per team.

Individuals may enter at a cost of £2. The entrant for the strongest individual can be a member of the team entry — but the event will be strenuous, so the organisers do not recommend it. Same rules and eligibility regulations as for the main competition apply.



Johan Brouwer, of Digital Equipment, demonstrates his skill in the football dribbling relay at last year's Computastars.

Ground rules of the competition

TEAMS will consist of not less than three and not more than five people.

Each team is required to nominate a No. 1 competitor who will, as well as being a member of the team, compete for the individual title.

The competition will be run in two sections — men and women. Teams will compete in regional preliminary heats.

The winning teams from each region will be invited to participate in the national finals. The top three men's and women's teams from the national finals will be invited to participate in European finals in Holland in September.

Each team must provide a marshal — not a team member — who may be required to assist in the smooth running of the competition. Failure to provide a marshal for each round in which a team competes will result in penalty points being deducted.

In each event in each round three members of the team will compete — the nominated No. 1 and any two of the remaining team members selected by the team captain. Team captains must be a member of the team, and with regard to team selection etc, the organisers will only recognise the team captain's selection.

Should the No. 1 be unable to compete after being nominated then the team captain will nominate a substitute from the remaining team members. If the substitute for a No. 1 is used after the competition has started, then neither the original No. 1 nor the substitute is eligible for the individual title.

If a No. 1 is substituted he may

not take part in the remainder of the competition. This rule will also apply to the nominated substitute.

Failure to comply with the nomination of teams and the rules of substitution will result in immediate disqualification.

The competition will normally consist of eight events. These will be selected from the following types of events, which apply to both men and women.

1. Running events — any distance up to a maximum of 800 yards per individual and may include hurdles.

2. Throwing events — with a range from a cricket/tennis ball up to a competition weight shot. Basket or netball type skills may be included within this category.

3. Kicking events — any number of categories which demonstrate foot co-ordination and skill, target shooting, penalties, dribbling, rugby drop kicks, hockey-style events.

4. Gymnastics — short, sharp and usually somewhat tiring.

In the running event teams may be required to run a relay. Running order will be at the discretion of the team captain.

In the case of a dispute the team captain and only the team captain will have the responsibility of representing his team.

The breaking — In the team competition, the points scored by the No. 1 will determine the team place.

In the individual competition the best effort in the last event will determine the individual place.

At all meetings the meeting referee's decision will be final and not subject to appeal.

Eligibility for events

ONLY personnel who are fully coated to data processing activities are eligible for Computastars.

Only personnel who are employed by their present company prior to February 1, 1981 can represent that company.

Should a competitor leave the employment of the company they represent then they will no longer be eligible to represent that company after the date of leaving the company.

Companies may enter one men's or one women's team or both, in each heat. Additional entries of one men's/women's team may be made in other regional heats.

Teams may consist of members of a company drawn from different locations.

Contract staff may be used subject to the qualifying conditions.

Once a person has been nominated for a specific team, they may not represent any other team in the competition.

Once a team entry has been accepted there will be no refund of the entry fee.

All cost incurred by teams are the responsibility of the teams.

All competitors participate at their own risk and the organisers do not accept any responsibility for any injury or loss of personal or company property.

All entries must be signed by the data processing manager or an equivalent authority.

How to trap the electronic spy

WITH the proliferation of data networks, concern is growing in the United States about electronic espionage in the form of wiretaps and unauthorised database access from remote terminals.

Computer-related fraud already accounts for losses estimated at \$2,000 million a year, a figure that is expected to rise dramatically as more systems go online.

As the stakes are rising, wiretapping is becoming easier and cheaper. Also, since the wiretaps can be operated remotely, today's eavesdroppers are less likely to get caught.

Further, since information may be stolen without being removed, the theft can go unnoticed so the information leak can continue indefinitely.

What may be worse, the intruder who gains access to a database may not steal the information but simply change it. The firm then operates unknowingly with false data.

Key control

In the face of this increasing vulnerability, users have a new tool for protection against unwanted intrusion.

It takes the form of a data encryption standard which defines an algorithm, or set of procedures, for enciphering data before transmission and deciphering the received messages.

To guard against unauthorised access, data may also be stored in encrypted form. While the so-called Data Encryption Standard, DES, applies only to US government agencies, it is also becoming a de facto private sector standard.

The DES algorithm is used for encryption in combination with a secret 56-bit key to encipher data in 64-bit blocks. The process involves a series of manipulations involving transposition and substitution of individual bits under key control, the process being inverted to decipher the message at the receiving end.

Algorithm and key are analogous to an electronic combination lock, where the algorithm is the mechanism and the key is the combination that locks and unlocks it.

Even if the mechanism design is known, a combination lock cannot be opened unless one has the combination. Similarly, even though the DES algorithm is public knowledge, encrypted data is secure while the key remains secret.

Critical note

Users derive many benefits from the DES standard. It gives them a valuable yardstick to evaluate data encryption equipment and the standard permits mass-production economies for semiconductor firms which can thus implement the DES algorithm in reasonably priced LSI chips.

Even so, there are a number of opponents who claim that the DES is inadequate and will only be useful for the next five years, since then advances in large-scale integration and computer science will make it possible to break a DES encrypted easily. Others question the circumstances surrounding the adoption of the standard, which involved some behind-the-scenes manoeuvring by IBM and the US National Security Agency.

DES history dates back to 1973 when the US National Bureau of Standards (NBS) requested the submission of data encryption algorithms for consideration as a Federal Information Processing Standard.

IBM responded by submitting an algorithm developed by Walter Tuchman and Carl Meyer of its Communications Systems Development Laboratory in Kingston, New York. NBS published the algorithm in March 1975, and it

became a Federal standard on July 15, 1977.

Before adopting the standard, NBS ran it by the National Security Agency (NSA), which is responsible for code making and breaking operations in the United States and the security agency persuaded IBM to reduce the key size from its original 128 bits to 56.

This gave rise to the charge that the NSA did not want a publicly available code that it could not break. Critics asserted that the NSA could eavesdrop on commercial transactions if it so chose by reducing the DES key size.

Fuelling suspicions even further, the security agency also asked IBM to classify its working notes on the algorithm. IBM had inadvertently reinvented techniques similar to those used by the agency in developing its own algorithms.

The controversy became so intense that the Senate Select Committee on Intelligence held hearings, concluding that the NSA did not tamper with the algorithm design and that IBM had agreed that the 56-bit key size was more than adequate.

Even so, controversy persists about the DES. One opponent, Martin E. Hellman, of Stanford University, claims that DES encryption could be broken quickly by using many parallel chips to test all possible key combinations.

Professor Hellman points out that a single chip searching one key per microsecond would take about a million days to exhaust all 256 keys, but that a million chips could search them in one day.

Public key

Professor Hellman is also concerned about possible "trapdoors" in the DES algorithm, which would allow IBM and NSA, for instance, to break the standard in minutes using a mini.

IBM's Tuchman dismisses the possibility of secret trapdoors, saying that they would be detected easily by NBS.

He also notes that if the 56-bit key were considered inadequate for an application, one obvious solution would be to encrypt twice for a total key length of 112 bits.

Tuchman estimates that the power needed to exhaust a 112-bit key would employ all the energy in the United States for 600 years.

He looks more favourably on another suggestion by Hellman, namely, using a "public key" system in which the encryption keys are known but decryption keys are kept secret.

A public key system could be particularly useful for electronic mail applications, for instance, or for authenticating digital signatures.

Professor Hellman views public key systems as a complement to, rather than a replacement of, conventional key systems. While such systems may sound totally insecure, proponents claim that they are unbreakable since the decryption key is derived by a mathematical relationship too complex for resolution by even the most powerful projected computer system.

He compares a public key crypto-system to a new kind of strongbox with two distinct combinations, the first used to lock the box and the second to unlock it.

Since the locking combination is public knowledge anyone can lock up information in it, but only the

person for whom the information is intended could unlock the box to retrieve the messages.

Similarly, public key crypto-systems could be used to protect against forging messages by authenticating a digital signature. The enciphering key would be kept secret in this case and the deciphering key made public, enabling anyone to validate the signature.

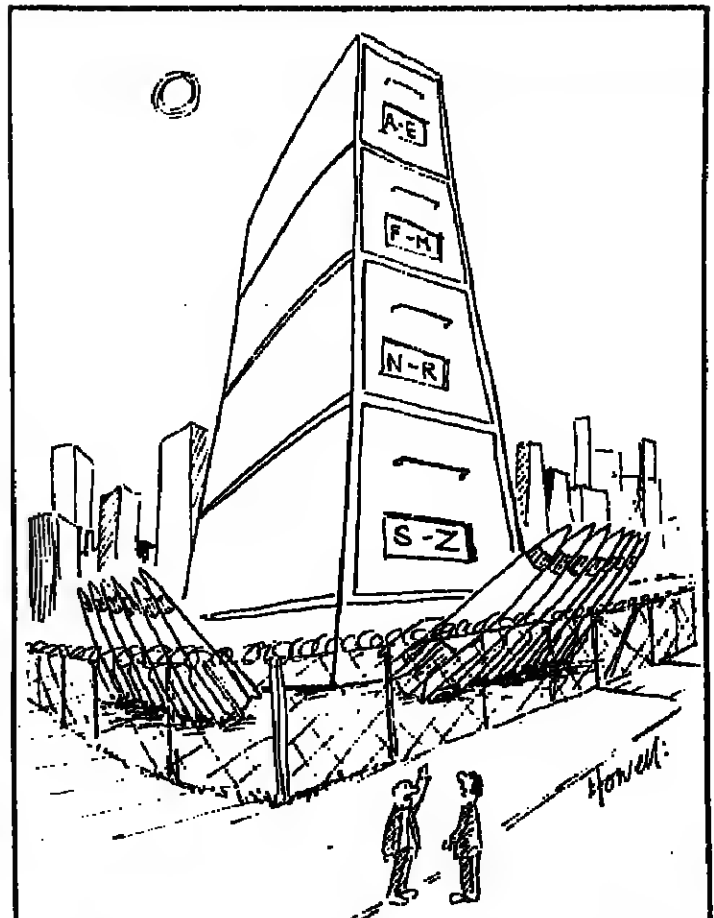
While IBM's Tuchman acknowledges that the public key algorithm has merits, he warns that it must be researched, tested and validated before it can be considered seriously for general use.

In the meantime, the DES algorithm is meeting the cryptographic acid test: it has been attacked for a number of years by experts in the field and they have not been able to show how to break it. Several manufacturers have implemented the DES algorithm in LSI chips and software implementations are also available.

In hardware a DES unit takes about six microseconds to encrypt or decrypt one 64-bit data block.

It takes about six microseconds to load a key or to load or unload either plain or enciphered text, typical software execution time running from 30 to 100 milliseconds.

While the mass-production economies of LSI circuitry may bring DES chips closer to the \$50 range, a stand-alone encryption device may cost \$3,000 or more because of additional circuitry and the programming needed to support a number of terminals and operating modes.



So here it is — the solution to all our electronic espionage problems!

When budgets are tight LABHIRE EASES THE PRESSURE

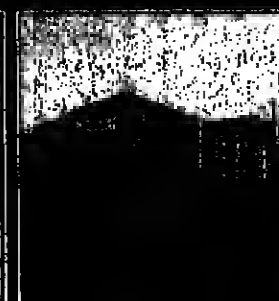
The biggest dilemma facing industry at home and abroad is just how to keep important projects on line when capital is tight and budgets are squeezed. Fortunately, when vital test measurement instruments or microprocessor based systems are needed you can turn to Labhire. Rental is the fast, simple way of acquiring equipment without touching capital budgets.

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CP*81

US Embassy
February 3-6PAUL FISHER PREVIEWS THE COMPUTER
PERIPHERALS EXHIBITIONUK market predicted
to reach \$3bn by 1982

THE peripherals business is immensely convoluted and original sources of design and manufacture often defy analysis. For all the complexity, it is undeniable that the Americans are still the predominant manufacturing force in the UK market. A stroll around the Computer Peripherals Exhibition at the US Embassy will confirm that.

According to Roger McCauley, director of the US International Marketing Centre, "The UK market for computer peripherals will reach \$3 billion by 1982 with US suppliers continuing to meet approximately 60% of this demand."

The figure of \$3 billion may smack of wishful thinking, but there are certainly rich pickings to be had.

Products from 43 US manufacturers are going on display including electrostatic printers and plotters, floppy disc drives, VDUs and word processing systems. The two Sinteroms - Elinor and Electronics - between them represent nearly a quarter of the manufacturers.

The exhibition, which is being held at the Embassy for the first time, is open from 9.30 until 5.30 on February 3, 4 and 5 and it closes an hour earlier on the Friday.

In the exhibition guide I have listed all the manufacturers in alphabetical order plus their UK distributor and your contact on the stand.

ABLE COMPUTER TECHNOLOGY
Sinterom Electronics (R. Lloyd)
A range of PDP-11 enhancements on display will include the Quivertex, a dual purpose bus converter which allows the LSI-11 Q bus to access Unibus compatible devices or the PDP-11 Unibus to access LSI-11 compatible devices. The Quadrayn/B and Quadrayn/C - four line DLIIC equivalents which provide an interface between the PDP-11 Unibus and four asynchronous communication channels, will be shown.

AGILE
ISG Data Sales (K. Osborne)
Featuring the new 4200 series data terminals which satisfy data entry and output needs. They in-

clude a 256-character buffer, a switch selectable 300 or 1200 baud rate, 55 cps printing and full speed operation with X-on/X-off. The series can be interfaced with most storage devices for offline data entry, text editing and word processing.

APPLIED DIGITAL DATA SYSTEMS
Terminal Display Systems (R. Crumpton)
This stand features VDUs ranging from a low-cost dumb teletype to intelligent buffered terminals. The company's manufacturing volume exceeds 5,000 units per month and the displays are installed throughout commerce and industry with a high percentage going to the OEM market.

BELLCOM
Computer Ancillaries (I. C. Skinner)
The Belcom 80 is a word processor with a keyboard, similar to the IBM Selectric with an equal print quality and a large display screen. The screen is used for copy/print correction, while simultaneously printing out unrelated documentation. The device locates/replaces words hundreds of times in a second. Copy can run through the display backward or forward at nine speeds and a display memory holds up to 25 pages with total floppy disc memory taking over 200 pages.

CONTROL DATA
Control Data (C. Keihley)
CP 81 provides the venue for the UK launch of the Finch fixed eight-inch rigid disc drive. Also on display is the Finch 9401, another member of Control Data's range of storage devices and the Lark - 9455 eight-inch disc drive (8-megabyte removable and 8 megabyte fixed disc) which uses an SMD interface. Semiconductor memories including a range of DRAM-compatible products are also featured.

DATA DEVICES INTERNATIONAL
Ryecote (J. A. Robson)
On this stand is the Century 22 magnetic tape cleaner/evaluator which reduces read/write errors and allows off-line evaluation and selection of tape reels prior to tape

drive mounting. CPU time is cut and the life of each reel of tape is extended. It incorporates a power arm system for tape stacking and tensioning.

DATARAM
Sinterom Elinor (J. H. Elinor)
On display is the LSI-11 with compatible chassis, memories, controller and micro. Features include a 5V4, eight slot chassis (24 amps on 5 volt supply); DEC LSI-11/2 microcontroller; DR-1155 dual board semiconductor ADD-IN; DR-115 quad board, core ADD-IN; RF-11/RF-05 compatible cartridge disc controller and TM11/TU10 compatible magnetic tape controller.

DATAROYAL
Pack-Addo (J. McDonald)
Models 4525 and 4526 matrix printers are low-cost matrix printers that print bi-directionally at

is a matrix printer operating at 150-200 cps. Its microprocessor control simplifies the unit into four modules with the keyboard built into the printer. The 1749 Maxidex magnetic tape transport handles both NRZ and PE tapes at 45 lps. It is supplied with dual-standard microprocessor formatter embedded into the transport electronics.

DIGITAL EQUIPMENT
Digital Equipment (D. Poole)
Numbered among products on display is the PDP 11/150 intelligent terminal. The two box enclosure contains a microprocessor with up to 32K words of RAM memory and twin 1/4 megabyte floppy discs. The terminal can be a VT100 video or a LA120-GA 120 cps printing terminal. Also featuring the LA120-RA terminal, the LA34-AA terminal and the PDP 151.

DURANGO SYSTEMS
Computer Ancillaries (I. C. Skinner)
On show is the Durango F-85. This is an all-in-one system comprising a processor, display screen, storage discs and printer. In addition, there is a word processing option consisting of a display screen, character printer and an extended storage facility including a 12-megabyte Winchester disc drive.

FLOATING POINT SYSTEMS
Floating Point Systems (C. M. Scanlan)
Featured on this stand is a range of array processors for high speed scientific processing. These models can be attached to all major mini and mainframe computer systems. Benefits include analysis of data in seismic exploration; calculation, reconstruction and en-

IMAGE RESOURCE
Sinterom Electronics (R. Lloyd)
Videoprint terminals come either instant print, negative or transparency. The Videoprint 3000 works with most personal computers with colour graphics capability. The Videoprint 5000 can be adapted to work with more sophisticated raster graphics systems.

INTERFACE MECHANISMS
Sinterom Elinor (J. H. Elinor)
The Model 8220 bar code printer is an electronically-controlled serial impact printer producing random, batch or sequential runs of Code 39 labels or tags. A bar code with the 8220 printer bar code with an interpretation line and one line of free text. The printing mechanism consists of continuously rotating print disc and electromagnetically actuated print hammers. Data input is through an RS232C serial interface.

KENNEDY
Kennedy International (R. E. Britten)
The 9800 half-inch tape transport incorporates a dual-density operation at 556/800 cpi, tri-level automatic chopping levels, a function, LED indicators and dual-density embedded format.

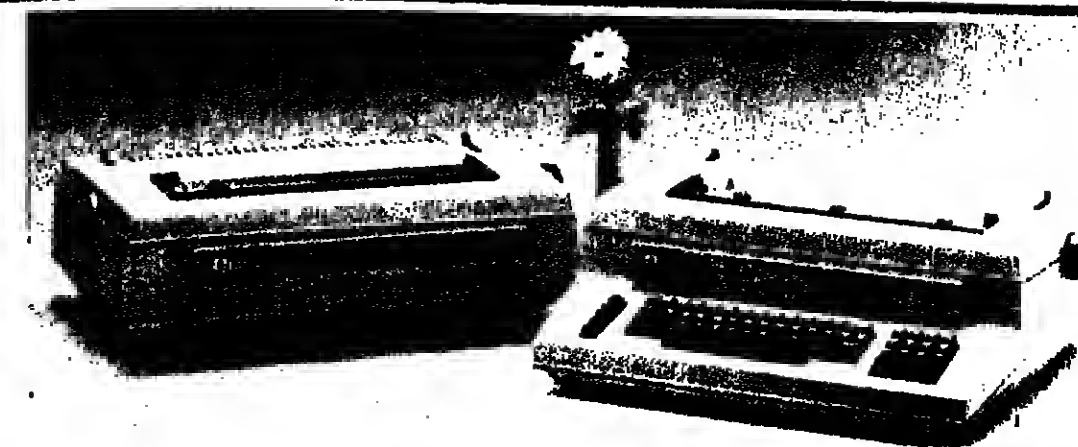
MANNESMANN-TALLY
Mannesmann-Tally (B. Dawley)
A range of peripheral tape drives includes: MT1602 1/2 inch matrix printer which is bi-directional 160 cpi and interfaces to T1612R0, receive only, 7x 7 1/2 9x9 serial matrix printer; T22000Q 200 lpm line printer; the T3300HR 300 lpm high-resolution line printer.

MICROPOLIS
Sinterom Elinor (J. H. Elinor)
On show will be the Micro Disk 1200 series of eight inch rigid disc drives for mini and microcomputer applications requiring high-speed random access disc storage at a lower cost than the 14 inch drive. The series incorporates up to three platters and a Winchester type head/media technology. Each consists of a drive mechanism assembly and a PCB package which provides interface for attachment to a controller. The interface allows up to four drive units to be daisy-chained to a single controller.

QANTEX
Euro Electronic Instruments (M. Dalley)
The 6000 is an impact printer suitable for mini or microcomputer output producing hard copy for CRT terminals, small business computer systems or as a message receiving printer. The 1000 magnetic tape communication system is a triple port storage device with RS232C compatibility. Also on display is the 5100 tape cartridge storage system for military applications.

QUME
Facit (J. McDonald)
ISG Data Sales (K. Osborne)
Featured is the Sprint 5 KSR printer that produces letter-quality copy at 55 cps. Many options can be elected to configure for a particular data terminal or printer.

RAMTEK CORP
Terminal Display Systems (R. Crumpton)
The 6000 Series colour computer is provided with English language commands such as delete, fill, fill, etc. A range of resolutions is available to suit various applications from 512x256 to 1,280x1,024. A maximum of 16 colours can be displayed from a palette of 64. Typical applications are management information systems, automation control, aerospace, command and control and education.



Sprint 5, the micro-bead delaywheel printer from Qume Corp is designed for easy integration into data processing applications. The printer comes in keyboard and receive-only versions.

Products from over 40 US manufacturers on display

rate of 250 KC (500 KC double density). Track-to-track access is accomplished within six milliseconds. The device is designed to MIL-E-16400 and MIL-M-38510/MIL-STD-883 class B micrologic.

NASHUA
Nashua Computer Products (F. I. Skinner)
A range of disc packs and floppy discs includes the Nashua 4473 disc pack - 300 megabyte - for use with CDC, Prime, Wang, and other equivalent disc storage drives. The 4464 80 megabyte disc pack is for use with ICL, GEC and similar disc storage drives. The 4443 disc cartridge - five and 10 megabyte - can be used with DEC, RLOI, and RLO2 disc storage drives and Nashua 4420 disc cartridge.

PIONEER MAGNETICS
Sinterom Elinor (J. M. Elinor)
Dependables are single and multiple output, high-current power supplies for OEM digital applications. Output transients caused by active loads do not exceed the regulation band in either overshoot or undershoot. The main features include the widest range of brownout protection; 30 millisecond output holdup after input power loss with full load; protects volatile memories; short-circuit proof and overvoltage protection.

PLESSEY PERIPHERAL SYSTEMS
Plessey Peripheral Systems (S. King)
The stand's centrepiece is a microcomputer system based on the LSI-11/2 processor. There are also a number of add-on peripheral products from the range of equipment for DEC and Data General minicomputers.

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MILTOPE
Sinterom Elinor (J. H. Elinor)
The DD400 flexible disc drive is displayed in a RAM drive that provides over a million bits of online storage of the user's data. The floppy disc is available in 5 1/4 inch and 8 inch formats. Any additional position can be accessed in random sequence at a rate of 10,000 or 0.01.

STEP ENGINEERING
ISG Data Systems (K. Osborne)
The Step 111 bit-slice development instrument is a hardware development tool for all bit-slice applications. It incorporates the world's fastest PROM simulator, a built-in logic static analyser plus terminal and debug-panel controls.

STORAGE TECHNOLOGY
STO Storage Technology (C. T. Cook)
The 4500 storage subsystem increases the productivity of intermediate system processors. Also on display is the STC 8650 double density disc drive which offers double the amount of data per spindle, or a total of 1270 megabytes. There are two models of the STC 8650: Model A2 contains control functions to operate a string of up to eight spindles and must be attached to an STC 8000-11 disc control unit; Model B2 attaches to the 8650-A2.

SUMMAGRAPHICS
Terminal Display Systems (R. Crumpton)
Bit Pad and ID provide XY coordinate information to the computer system. The Bit Pad is for menu picking in many diverse application areas such as data entry, cursor control, education, design and draughting, business, medical, petrochemical and games. The ID range caters for the user who requires larger tablets or more exacting data manipulation within the digitising system.

SYKES DATATRONICS
Terminal Display Systems (R. Crumpton)
The Comm Stor range of communications storage units comprises four models for attaching to VDUs or printers to provide data storage. They provide elaborate data preparation, logging, editing and forms capability. Time sharing users are promised savings in phone costs and connect time charges.

TDX PERIPHERALS
Euro Electronic Instruments (M. Dalley)
On display is the TDX Series 11 which is a 75 lps tape transport, suitable for OEM and end user applications. The unit incorporates a low-inertia tape buffering mechanism.

TELEPROCESSING PRODUCTS
Appen Electronics (P. A. Johnson)
A modern simulator, the TP-232, is used to replace a pair of modems in short distance local applications. The TP-270 Network Analyser measures system response time in a 3270 network. More significantly, it provides specific measurements of the elements contributing to response time, so that changes can be evaluated.

TEXAS INSTRUMENTS
Texas Instruments (A. Simmonds)
The Silent 700 and Omni 800 terminals include both the 745 and 765 portable data terminals, with the latter incorporating magnetic bubble memory. For users requiring high speed printers the 120 cps Model 783KSR thermal printer

ter, with the 150cps Omni 800 impact printers, the 810R0 and 820KSR, are also on display.

TOPAZ
Euro Electronic Instruments (M. Dalley)
Power peripherals being displayed include Line 2 power conditioners, an ultra-isolator and AC line regulator. The Line 2

combines noise-suppressing capabilities of the ultra-isolator with the regulating properties of the AC line regulator.

VERSATEC
Versatec Electronics (W. R. Bofin)
A vector processor on this stand provides offline vector plotting and translates vector plot data to

raster format while freeing the computer for other tasks. It accepts all print, vector, compressed raster, or raster plot data from magnetic tape. In addition there is the V-80 series of electrostatic printer/plotters. The main features include: high-speed printing, 1000 words per minute; high resolution, 200 lpi per inch and multi-functions.

WABASH TAPE
Wabash Tape (UK) (J. A. A. son)
Quadrasonic I computer tape magnetic tape produced and filed in a virgin state with its tered surface guarantee minimises error growth power for read failure, eliminates curving errors and promotes head life.

Only one company puts this much
in a £475 teleprinter.

It's got more features than any other 30cps teleprinter. It's compatible with just about every computer there is. It's dependable. It's readily available. And it costs just £475 on orders of 200. Only the LA34 teleprinter gives you so much. Only one manufacturer could charge so little for it. Digital. You see, we're the world's leading manufacturers of terminals. And when you look at the LA34, you see why.

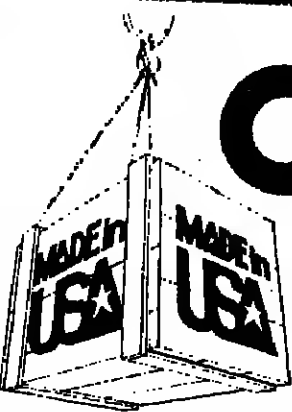
- Principal Features:**
1. Desk-top unit based on conventional typewriter design - ensures rapid operator acceptance.
 2. True 30cps average speed, 45cps catch-up rate.
 3. 9x7 dot matrix gives remarkable clarity.
 4. Full 128 ASCII character set.
 5. 10, 12, 13, 2 of 18 characters per inch.
 6. Up to 12 columns using star dard font, 218 columns using compressed font.
 7. Adjustable linespacing: 2, 3, 4, 6, 8, or 12 lines per inch.

8. Uses ordinary paper: single sheets, or continuous listing.
 9. Easy-to-change cartridge ribbon.
 10. Just 25lb weight!
- Options:**
- Numeric keypad. Tractor feed. Terminal stand. Paper roll holder. Paper tray. Paper switch. "Paper roll" switch. 20mA interface. Extended logic option. Optional spacing.

* £475 price on order of 200 direct from Plessey (typical unit price of £475 plus postage and packing costs for local LA34 models).

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SYSTEMS
DataMedia CP 100
LSI-11/2
LSI-11/23
PDP-11/54A
PDP-11/54A
PDP-11/54A

CSPI
Euro Electronic Instruments (M. Dalley)
The Map series of array processors, when interfaced to virtually any kind of supermini computer, improves computational speeds by several orders of magnitude. Map offers multiple architecture allowing completely overlapped I/O, arithmetic processing and control non-interfered memory structure permitting direct addressing of bytes, 16-bit half words, 32-bit full words and 64-bit double-precision words.

DIGITAL DATA
Dig-Data (D. W. Holland)
Exhibited here for the first time is the 2514 printing terminal which

150 cps. A 9x9 dot matrix with true decoders guarantees clear-cut printouts. The 4525 uses an 80-column printing format and the 4526 uses 132 columns.

DATUM
Datum (Electronics) (K. Shuttlebottom)
Presented on this stand are a formatted D451, 45lps, dual density magnetic tape drive; a CDC30-megabyte storage module, and a range of embedded computer peripherals including the TM11 PDP 11 magnetic tape controller; PDP 11 storage module controller; PDP 11 disc cartridge controller; LSI 11 magnetic tape controller; LSI 11 disc controller; IBM Series 1 magnetic tape controller with UUA Board; IBM Series 1 line printer controller; Nova magnetic tape controller and the Nova disc cartridge controller.

GENRAD
ISG Data Systems (K. Osborne)
The 2300 range of Universal microcomputer development systems comprises stand-alone or multi-user systems capable of supporting the most popular 8 and 16 bit microprocessors. The company makes test equipment for all stages of electronic equipment development including original design, production testing and field servicing.

HEWLETT-PACKARD
Sinterom Electronics (R. Lloyd)
Both the 2621A and 2621P terminals are for interactive applications. The 2621P with an integral thermal printer combines the convenience of local hard copy with the speed of a video terminal. The main points of the 2621 are high resolution CRT display; two full pages (48 inches) of memory; a maximum 120 cps print speed; 68-key, typewriter-style, detached keyboard and character mode editing.

HOUSTON INSTRUMENT
Sinterom Electronics (R. Lloyd)
Digitizers and plotters on exhibition include Hi-Pad and Hi-Plot. Hi-Pad is an input device converting graphic information into digital values with user selection of various operating parameters by interface logic signals (jumpers). Anywhere there is a choice of English or Metric scaling, data format (binary/BCD/ASCII) and resolution of either 0.005 or 0.01.

DURANGO SYSTEMS
Computer Ancillaries (I. C. Skinner)
On show is the Durango F-85. This is an all-in-one system comprising a processor, display screen, storage discs and printer. In addition, there is a word processing option consisting of a display screen, character printer and an extended storage facility including a 12-megabyte Winchester disc drive.

IMAGE RESOURCE
Sinterom Electronics (R. Lloyd)
Videoprint terminals come either instant print, negative or transparency. The Videoprint 3000 works with most personal computers with colour graphics capability. The Videoprint 5000 can be adapted to work with more sophisticated raster graphics systems.

INTERFACE MECHANISMS
Sinterom Elinor (J. H. Elinor)
The Model 8220 bar code printer is an electronically-controlled serial impact printer producing random, batch or sequential runs of Code 39 labels or tags. A bar code with the 8220 printer bar code with an interpretation line and one line of free text. The printing mechanism consists of continuously rotating print disc and electromagnetically actuated print hammers. Data input is through an RS232C serial interface.

KENNEDY
Kennedy International (R. E. Britten)
The 9800 half-inch tape transport incorporates a dual-density operation at 556/800 cpi, tri-level automatic chopping levels, a function, LED indicators and dual-density embedded format.

MANNESMANN-TALLY
Mannesmann-Tally (B. Dawley)
A range of peripheral tape drives includes: MT1602 1/2 inch matrix printer which is bi-directional 160 cpi and interfaces to T1612R0, receive only, 7x 7 1/2 9x9 serial matrix printer; T22000Q 200 lpm line printer; the T3300HR 300 lpm high-resolution line printer.

MICROPOLIS
Sinterom Elinor (J. H. Elinor)
On show will be the Micro Disk 1200 series of eight inch rigid disc drives for mini and microcomputer applications requiring high-speed random access disc storage at a lower cost than the 14 inch drive. The series incorporates up to three platters and a Winchester type head/media technology. Each consists of a drive mechanism assembly and a PCB package which provides interface for attachment to a controller. The interface allows up to four drive units to be daisy-chained to a single controller.

QANTEX
Euro Electronic Instruments (M. Dalley)
The 6000 is an impact printer suitable for mini or microcomputer output producing hard copy for CRT terminals, small business computer systems or as a message receiving printer. The 1000 magnetic tape communication system is a triple port storage device with RS232C compatibility. Also on display is the 5100 tape cartridge storage system for military applications.

QUME
Facit (J. McDonald)
ISG Data Sales (K. Osborne)
Featured is the Sprint 5 KSR printer that produces letter-quality copy at 55 cps. Many options can be elected to configure for a particular data terminal or printer.

RAMTEK CORP
Terminal Display Systems (R. Crumpton)
The 6000 Series colour computer is provided with English language commands such as delete, fill, fill, etc. A range of resolutions is available to suit various applications from 512x256 to 1,280x1,024. A maximum of 16 colours can be displayed from a palette of 64. Typical applications are management information systems, automation control, aerospace, command and control and education.

MILTOPE
Sinterom Elinor (J. H. Elinor)
The DD400 flexible disc drive is displayed in a RAM drive that provides over a million bits of online storage of the user's data. The floppy disc is available in 5 1/4 inch and 8 inch formats. Any additional position can be accessed in random sequence at a rate of 10,000 or 0.01.

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How to become a competent programmer

Guide to Good Programming Practice, edited by Brian Meek and Patricia Heath. 128pp. £10.50 (hardback) and £3.95 (paperback). Published by Ellis Horwood Ltd, Market Cross House, Cooper Street, Chichester, PO19 1EB.

THIS collection of 19 essays is grouped in five chapters with contributions from 10 different authors, providing a readable account of an excellent range of topics.

Chapter 1 is entitled Strategy and Design and the introductory section states: "The object of this book is to present, in a compact and assimilable form, the essentials of what is involved in being a serious and competent programmer."

In a textbook any omissions, and these would be inevitable, might lead to criticism by a reader missing his or her particular fetish. Taking a few essays at random may give some impression of the topics covered. In the first group

there is a contribution entitled Design of Algorithms, which is one of the longest essays in the book.

It is both readable and, among other things, gives a very good account of recursion with reasons and justification for its use together with some simple examples.

This is a technique which is often difficult to explain to students who have not found the need for it and this account is very well presented.

Chapter 2 is on program writing and covers choosing the language, programming language standards and structured programming.

The programming language standards mainly refer to Fortran, but there are points which can be applied to many languages.

The essay on structured programming is practical and one of its sub-sections is an analysis of its original, unstructured, form and then re-written with the improvements explained in detail.

The third chapter, Program Development, has three contributions: Structured Programming and Error Prevention which ought to be mandatory reading for every novice programmer; Testing and Debugging, which is seldom covered in standard programming texts; and Improving Run-time

Performance which is mainly Fortran-orientated.

Chapter 4 bears the heading Special Problems and covers heuristic programming, large quantities of data, large programs, programs with long run times and real-time programs.

One example worthy of note is contained in the essay Large Quantities of Data which uses as an example the computation of mean and standard deviation from a set of data. This is one of the most programmed algorithms.

This text is to be recommended most strongly to any student or practising programmer. The more experienced may not agree with every statement or view expressed in the book but would acknowledge the thought provocation.

As a final quote from the Introduction explains: "Some of the advice may strike you as trite and obvious; if so, well and good. If some helps you to recognise, formulate and rationalise things you already know into a coherent 'philosophy of programming', even better."

"If anything strikes you as a new idea worth considering (or possibly as a brilliant flash of enlightenment), that is best of all."

D. W. BALE

IFIP report is weighty in every sense

Information Processing 80, Proceedings of IFIP Congress 80. Edited by Simon Lavington. 1070pp. \$102.90 North-Holland Publishing Co, PO Box 211, Amsterdam, Netherlands. Tel: 01031/205153347.

AS consolation for those unable to attend the IFIP 80 congress held in Tokyo and Melbourne last October, the proceedings are now available in the form of a hardback book which is weighty in every sense of the word.

Edited by Simon Lavington of Manchester University Department of Computer Science, the book details all 160 or so invited and submitted papers, discussing the information or message presented often considerably more comprehensively than the actual spoken presentation.

The only major parts of IFIP 80 not covered are the 30 plus panel sessions held in Tokyo and Melbourne. Summaries of these were scheduled to appear after the congress in the Australian Computer Journal and the Journal of Information Processing published by the Information Processing Society of Japan.

IFIP 80 was the first World Computer Congress organised by the International Federation for Information Processing to be held outside North America and Europe and the first to be staged at two locations.

Tokyo provided the opportunity for English-speaking representatives from some of Japan's leading computer manufacturers

and research bodies to describe their work to a large Western delegation. The Japanese papers included fascinating accounts of novel computer architectures and dedicated database machines.

Database technology, with the social and economic implications of computers, were the two topics treated as areas of interest in their own right for the first time at IFIP 80.

Invited papers in the social and economic area included a depressing but thought-provoking discussion initiated by Calvin Gottlieb of Toronto University Department of Computer Science.

Gottlieb predicted that the use of computers would inevitably become more controversial with serious unemployment a certainty in the manufacturing sector.

He produced figures showing how several different organisations had increased productivity dramatically despite big reductions in their workforces and saw a day when computer professionals would refuse to participate in job-shedding projects.

The eight other subject areas covered by IFIP 80 were theoretical foundations of information processing, computer architecture and hardware, software, computer networks and communications, computing in science and industry, business and government applications, computers in everyday life and information processing and education. K.J.

Making case for 'project' approach

Project Management: A System Approach to Planning, Scheduling and Controlling. Harold Kerzner. 500pp. Published by van Nostrand Reinhold (1979).

THIS book sets out to sell the idea of project management - a management organisation structure around the production of a particular product. Kerzner argues that a project structure leads to greater management control, better estimating and budget management, and to an eventual better performance for the company.

Using plentiful examples and case studies, Kerzner shows how project organisation can be introduced in a company and how it should be organised.

Later chapters explain planning processes, show how GANTT and PERT/CPM techniques can be used in scheduling, review, describe pricing, and plain schedule and cost control.

Kerzner writes confidently, short sentences rich with American management jargon, but a style conceals a genuine understanding of his subject and the which are sound common sense.

The book shares the full management texts - making the process seem very straightforward and simple - but the practical chapters in particular are authoritative and useful.

MARTYN THOMAS

Fun approach to maths

Adventures with your pocket calculator, by Lemart Rade and Burt Kaufman. 139 pp. 95p. Penguin Books Ltd, 536 Kings Road, London, SW10 0UH. Tel: 01-351 2393.

ONE gripe I have always had against pocket calculators is that they weaken drastically the user's powers of mental arithmetic. Here is the antidote from Penguin Books.

Both mathematicians, the authors assume that the reader knows his/her way round the keyboard. If you don't, first read up on how to use a calculator.

The book is divided into two parts: a section in which the adventures are outlined and a section in which comments are made about them.

Most makes of calculator will be adequate for the exercises, though one or two of the tests require a

machine with a square root key unless you want to work out long-hand.

There are 20 chapters covering magic squares, playing numbers, least common multiple squares, palindromes, the perfect number, prime numbers, etc.

As a fun approach to maths using pocket calculators, it may not make your brain hurt.

CHRIS YOUNG

Feast of DP meanings

The Essential Computer Dictionary and Speller, by Charles J. Sippl, with JoAnne Coffman Mayer. £9.70. Prentice-Hall International.

DP 'PEOPLE' - and those who write about them - are constantly extending their vocabularies with the latest buzz-words, acronyms, and technical jargon.

For anyone whose job requires familiarity with 'computers' or 'electrotech' (these words, incidentally, are not part of the dictionary, but culled from the fly-leaf) this volume provides a ready source of both spellings and meanings.

It defines more than 15,000

computer terms, and is illustrated with more than 100 pictures.

Much of the information will be familiar; some of it less so. For instance, hands up all who know what is a 'variometer' or a 'Proport'?

And if you thought that 'smudge' was an acronym for the latest in new technology, rest assured that, according to Sippl, it is nothing more than 'In optical character recognition that is some place it doesn't belong'. Did we really need to be told that?

From much explanation, readers will have gleaned that the authors are American. Hence some slightly unfamiliar spellings ('defense'

'fiberoptics', 'signaling', 'Sippl' is a computer industry consultant, and was the author of 'Computers for the Beginner' by John Coffman Mayer is Director of Data Processing at Palomar College, San Marcos, California.

Whatever unfamiliar words and spellings they have come up with, this volume could well prove to be an essential reference book. We also would the reviewer could find the way to Computer World's sub-editor's desk?

Of course, you all know that a computer is 'a variable attendance in a circuit whose flow is controlled by a program' and 'Proport' is a blank space control of system.

Mine of standards information

Programming Language Standards, ed. I. D. Hill and B. J. Meek. 261 pp. Ellis Horwood.

PROGRAMMING language standards are usually encountered in the context of a particular language or software system. While such standards are obviously valuable, much confusion is caused by the different standards organisations and the

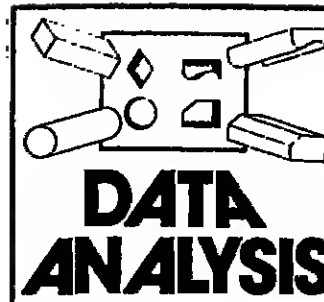
relationships between them, how standards are developed and the ultimate purpose of standards activity are often unclear.

This book fills in the background by supplying an admirably clear and comprehensive introduction to the whole subject. Part I discusses particular software standards. An introductory chapter on the standardisation process is followed by detailed accounts of the

standardisation of Fortran, Cobol, Algol 60, PL/I, Basic and Pascal. Part II consists of a wide-ranging 'discussion' of standardisation issues, constructed from written comments by the authors and others.

The book is a mine of standards information, covering philosophical discussion and practical details of the standardisation process.

PETER WALLIS



DATA ANALYSIS

PART 14 of the series described the technique of access path analysis, a method of determining and documenting the types of entities and relationships involved in a function.

In order to perform access path analysis we had first to identify the "elementary functions" and then to draw functional models describing them. Access path analysis has several purposes, two of which are the checking of the entity model and the provision of the data for database design - will be explored in this article.

Documentation

To help the database designer, not only must the access paths and entity points be determined for each function, but quantifiable facts must be available on the frequency of the activity on the data.

In other words, it is no use knowing that the patient entity type is accessed, unless it is also known how often it is accessed, 500 times per day, 200 times per month, etc. When designing a database only a certain number of access paths can be made efficient, hence the most important functions must be established and frequency estimates made. All the basic facts are available to provide this information - it only requires that the data be summarised.

The "Access Path for a Function" documentation form is shown in Figure 1, filled in with the example used in previous articles, the "Handle Patient's Death" function.

In Part 10 the function "Handle Patient's Death" was described and the form used to document functions was shown. It can be seen that the frequency of the function was documented. It is this figure that is used to make the Frequency Assumption (7) on the form.

The Response Required (6) is that required by the user, e.g. he may be prepared to let it wait for a day, it may be urgent (because it affects other functions), or it may be so infrequent and unimportant that the response required may be "within a week".

Access path for function form

The description from the function form, the data flow diagrams and the function hierarchy are all used to perform access path analysis. The steps used to draw the function models were explained in Part 14. The access path for a function form is filled out at the time the function models are drawn. It is achieved as follows:

1. The description of the function is worked through and each entity type and relationship type listed in the order in which they are likely to be involved.

2. The action on each entity type is recorded. The following symbols are used to denote the permissible actions:

M - Modify (one or more attributes of the Entity)

R - Retrieve

C - Create

D - Delete

In our example the attributes of the entity type Patient have been

modified (M) and Operation and Appointment have been deleted.

3. The action on each relationship type is recorded. The following symbols are used to denote the permissible actions:

C - Connect (add a member to a relationship)

D - Disconnect (delete a member from the relationship)

T - Transfer (disconnect a member from one relationship and simultaneously connect it to another of the same type)

More complex functional models

Section I - Part 15

of our series describing a system design methodology by Rosemary Rock-Evans

ties of different types. An example is shown in Figure 2 where an "Illness" entity has been found by the intersection between the relationships with two entities - Patient and Type of Illness.

5. The Volume figure always describes the number of entities of the entity type which are accessed per function, NOT per month, or per day, etc. The per month or per day volumes are calculated later.

Thus, in our example the function "Handle Patient's Death" handles one patient at a time. To calculate the volume of other en-

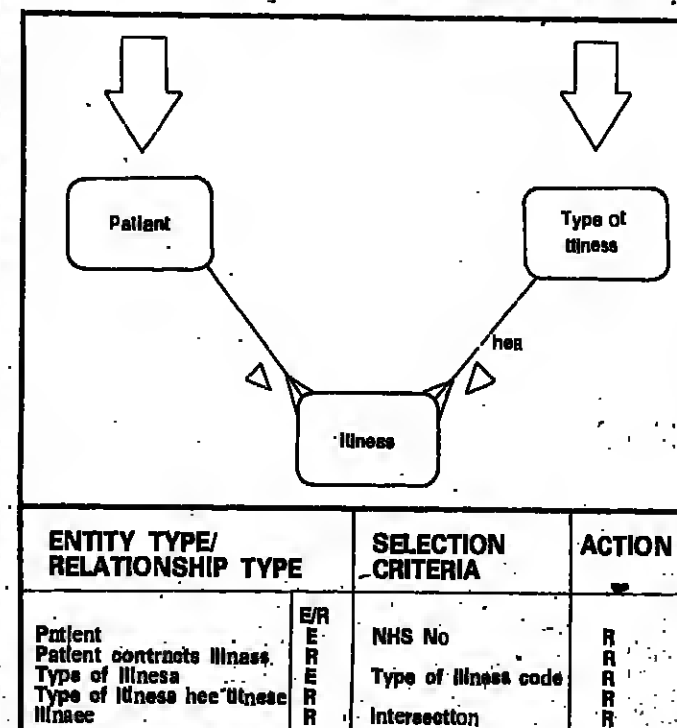


Figure 2. "Intersection."

R - Retrieve (implies use of relationship type only)

4. The selection criteria used to access an entity type are recorded. Selection may be made via:

a) The attribute types which constitute the key of the entity type, e.g. in the example, the NHS number is the key of the Patient entity type.

b) The key and other attribute types, e.g. if a range of keys was known but further selection was to be made.

c) Attribute types other than the key, e.g. All Males (sex code) over 50 (date of birth).

Where entities of one type are accessed via a one-to-many relationship type with an entity of another type, it is said that the single entity is the parent and the many entities found by the relationship are the children.

The term 'intersection' is also used, when an entity or entities of one type are retrieved by using the relationships with two other entities.

50% of Appointments have been completed, the task of Cancelling the Appointments would on average involve 3 Appointments. Maximum figures can be used as well, if desired.

The Access Path Forms will be discussed in detail in later parts of the series, when database design considerations are covered. It can be seen, however, that knowing the response required, and details of the frequency of functions, provides the database designer with very useful information.

Temporary entities

Access path analysis occasionally leads to the discovery of entity types which have not been identified in the earlier stages. It is possible for entity types to be created and destroyed during the execution of an elementary function, making the entity type so temporary that it may not have been identified until the function has been examined in depth.

Temporary entities can be as important as the more permanent entities which are used by more than one elementary function, and must be documented and shown in the model.

It is often found that these temporary entities have attribute types, which under the old systems

FUNCTION ANALYSIS DOCUMENTATION ACCESS PATH FOR A FUNCTION

1. Analyst: R.R.E.
2. Date: 1/1/80
3. Version: 001
4. Status: Draft
5. Function name: Handle Patient's Death
6. Response req'd: Online (immediate)
7. Frequency assumption: 40 max per month, 40 aver per month/growth 0%

Entity type (E)	Relationship type (R)	Selection criteria	Action	Vol	Not
Patient	E	NHS No (Key)	M	1	
Patient undergoes Operation	R		R		
Operation	E	(member) operation date	D	2	
Patient makes Appointment	R		R		
Patient has Patient's Medication	E	(member) Appointment date	D	3	
Patient's Medication	E	(member) Active Medication	M	2	
Patient has Ward Bed	R		R		
Ward Bed	E	Owner	M	1	

Figure 1.

design methods might have been found in the working storage section of a program, or in 'transaction files'. These entity types are not transaction files, however, nor entity sub-types. They have their own unique attribute types and never be made at an earlier stage. Compromises should never be made during design, all the facts are known, and during analysis, when they are being determined.

This article has covered the path analysis documentation in the functional model. In the part of the series the Access Analysis Forms will be used to summarise the functional entity types.

The Data Analysis method was developed at CACI by Palmer.

Decisions to be left

Decisions on which attribute types and entity types are to be made permanent and which temporary should be left until all the functions have been analysed. The

TDS offer the ADDS Regent 20 for as little as...

£399

it's the Best for the least

A superb styled terminal, full upper & lower case, easy to read 5 x 8 characters in a 24 x 80 character format. EIA interface: speeds up to 9600 baud. Full incremental cursor movement and addressability - auxiliary output interface, print transparent capability - plus monitor mode... all this for only £399. If you can find a higher value terminal at a lower cost then buy it.

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The ASCOT Tektronix compatible graphics terminal for just

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The Ascot terminal will give you 612 x 256 graphics with full Tektronix 40/01 emulation.

To take advantage of these low prices, ring our action desk on 0254 678921. 108 Ltd, Philips Road, Whitechapel Estate, Blackburn, Lancs. BB1 6TH.

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Delivery Address

TDS

TDS Ltd, Philips Road, Whitechapel Estate, Blackburn, Lancs. BB1 6TH.

ACI on 1/1/80

Cassette drives add ZIP to Data Dynamics range

A TERMINAL, the ZIP ASR/K7, incorporating two mini cassette drives, printer and keyboard in a single unit is available from Data Dynamics.

This unit is the latest addition to Data Dynamics' range of ZIP computer terminals and can be used on a desk top or optional purpose-built stand.

Cassettes can be operated in either a local or online mode, fully emulating the paper tape reader-punch facilities available on a paper tape ASR.

This allows the ASR/K7 version to replace the paper tape ASR in a working system, without any changes to the host equipment hardware, software or the connector joining them.

As with the paper tape ASR, the cassette version responds to DC1, DC2, DC3 and DC4 control codes and operates transparently to the host system.

Each cassette has an identifica-

tion header of up to 20 characters. Data is stored in blocks of 249 characters and each cassette has a 31,872 character (128 block) capacity.

Although up to 10 different files can be opened on each cassette, any file can be as long as required. Communication online with the ZIP ASR/K7 is at 300 or 110 baud. The standard interface is V24 (RS232C) or 20mA current loop operating at half or full duplex (user selectable). Even, odd or parity may be chosen.

A seven-needle print head is employed which prints the full ASCII character set in 5 x 7 dot matrix format.

The ZIP ASR/K7 with a friction drive can employ standard Teletype friction roll paper and a pin feed version is also available.

Data Dynamics (CW), Data House, Springfield Road, Hayes, Middx. Tel: (01) 848 9781.



Paper Tiger to bridge print gap

TELEPRINTER Equipment, the peripheral specialists, has introduced a printer which is said to bridge the gap between conventional matrix and daisy wheel types.

The Paper Tiger 560 offers full width 132-column printing at 160 cps, and many "print versatility" features.

Unlike most daisy wheel printers, it has an inbuilt tractor feed as standard.

To achieve this level of printout, Teleprinter Equipment has developed a unique nine wire staggered column ballistic head overlapping the dots of each matrix character vertically and horizontally with one pass of the print head filling in the gaps between the dots.

Despite being more sophisticated than other print heads, the new unit has a proven life of at least 300 million characters, a figure which many of its conventional counterparts cannot match.

To cut consumable costs, the ink ribbon drive mechanism is designed to use all parts of the ribbon. The cartridge contains 36 yards of ribbon and is rated to print up to 16 million characters.

Another major feature of the unit is that it incorporates a bi-directional logic-seeking device allowing reverse printing and white space skipping.

The 560 also has selectable features like mono or proportional spacing, automatic justification, programmable horizontal and vertical tabbing and "fine" positioning for word processing applications.

Other standard features include a full upper and lower case character set, eight software selectable character sizes, parallel and RS 232 serial interfaces and XON/XOFF line protocol.

Teleprinter Equipment Ltd (CW), Akeman Street, Tipton, Herts HP23 6AJ.

Printer takes a bow

ROXBURGH Printers has added the X80SP Intelligent Plotter to its existing plotter family, claiming that it includes more features than any other printer in the same price range.

These features include three character generators each with 128 characters (one being fully programmable), bi-directional printing and paper feed, 8 x 7 matrix, horizontal and vertical tabs.

Various versions are available with interfaces for Pet, Apple II, HP, Centronics parallel and RS232C.

The X80SP is 49.5cm wide, 31cm deep and 14.5cm high with a weight of 9.5kg. The RS232C/20mA version retails at £840 and £795 for all other versions.

Roxburgh Printers Ltd (CW), 22 Wincobles Road, Ry, Sussex TN31 7BR. Tel: (0777) 3777.

Open reel tape drive with advanced features

TEKDATA Electronics has released an advanced open reel tape drive. Full advantage has been taken of LSI low power Schottky TTL with a recording density of 800 or 1600 bpi (NRZI/PS).

The system can be switched by the tape drive, formatter or under program control and operator error is eliminated when reading back tapes as the recording density is determined by the tape automatically.

The drive can be returned to a steady state on command from the formatter after power failure and there is no need to reload the tape manually.

Maintenance has been simplified because of the modular construction, front opening frame and built-in maintenance switch and 100V, 120V, 220V or 240V mains voltage can be accommodated with an average estimated power consumption of 140W (250 Watt maximum).

The formatter has been simplified compared to conventional designs. It is small enough to fit inside the tape drive unit with up to four drives daisy chained.

There are 8-inch (MT-800) and 10-inch (MT-1000) reels. All models accommodate ISO, ANSI, ACMA, JIS and IBM-compatible data formats enabling tapes produced on the MT-800/MT-1000 to be processed on computer systems

elsewhere. Tekdata Electronics Ltd (CW), Unit 1, Federation Road, Burslem, Stoke-on-Trent ST6 4MY.

Brochure
A BROCHURE describing the Petbow Powercentre electronic control system is available on request from the company. Petbow (CW), Sandwich, Kent. Tel: 03046 3311.

Join a company that's making real progress

1979 \$2.2m - 1980 \$11.5m - 1981 \$34m

Storage Technology is the fastest growing main-frame peripheral computer manufacturer in Europe.

Whether you take staff levels, boxes installed or turnover we're making real progress so now we're looking for more people to help with our 81/82 programme.

Systems Engineers, Senior Field Engineers and Field Engineers

Excellent salary plus bonuses and allowances. Company car, free medical service and usual big company benefits. The successful applicants will have a good knowledge of systems and

peripherals with several years experience of main-frame computers desirable.

Apply in writing, with curriculum vitae, to Norman Howarth.

UK Engineering Manager, Storage Technology Limited, 2 Rubastle Road, Southall, Middlesex UB2 5LL or telephone him on either 01-571 0062 or 01-898 1821/8.

Appointments

THE NEWSPAPER COMPUTER PEOPLE RELY ON

Appointments

COMPUTER WEEKLY

Classified Department: Classified Section, The Computer Weekly, 14 Old Park Lane, London W1Y 4NL.

Box Numbers: Single copies addressed to the Classified Department, The Computer Weekly, 14 Old Park Lane, London W1Y 4NL.

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SYSTEMS ANALYSTS & PROGRAMMERS

Thorn Consumer Electronics, a major Company within the Thorn EMI Group, is the largest British manufacturer of colour and monochrome television and recording equipment, with production plants at Enfield and Gosport and at eight other locations in the UK. The Enfield factory is manufacturing the revolutionary Ferguson TX10 colour televisions as well as business terminals and other developments connected with the commercial application of the television screen.

The major marketing, administration and accounting offices are also based at Enfield and are linked to the Company's ICL 2900 installations throughout the UK. The department provides a computing service to all parts of the Division covering payroll, material control, sales and finance and is constantly working to improve the efficiency of the organisation by the introduction of automated systems. The department has recently taken delivery of the latest ICL 2945 computer with memory of one megabyte. It is capable of supporting the on-line network of video terminal screens situated on the Enfield and Gosport sites.

SYSTEMS ANALYSTS

We have a requirement for Systems Analysts with at least five years experience preferably gained in a commercial or industrial undertaking who have had the responsibility for the implementation of a medium size system. The ability to communicate easily with people at all levels and understand and solve the individual problems related to the many and varied activities on site are essential personal qualities.

Applicants should be educated to degree level or have relevant practical and theoretical knowledge. The continued expansion of computer application throughout the group offers excellent prospects to senior personnel, and considerable scope for career development and advancement.

SENIOR PROGRAMMERS

We are interested in recruiting Senior Programmers with a sound knowledge of ICL 2900 and 2900 Cobol and a minimum of two years commercial applications programming experience. Our latest installation of ICL 2900 equipment offers programmers the opportunity to gain invaluable experience of structured programming. As part of a professional team, those appointed will be expected to take advantage of formal training in on-line techniques and be responsible for supervising Junior Programmers. The Company offers excellent salaries and progression scales, plus the normal fringe benefits associated with a large organisation. Consideration will be given to assistance with relocation expenses.



Please telephone 01-563-5353 extension 2051 for an application form, or write to:
The Personnel Manager,
Thorn Consumer Electronics Ltd.,
Great Cambridge Road, Enfield, Middlesex EN1 1UL.

THORN CONSUMER ELECTRONICS LTD.

THE UNIVERSITY OF LEEDS

SENIOR SYSTEMS ANALYST

ADMINISTRATIVE DATA PROCESSING SECTION

Applications are invited for a post of SENIOR SYSTEMS ANALYST in the Registry to lead a team of eight analysts and programmers maintaining and developing a wide range of applications for the Central Administration of this large University.

Applicants should have not less than five years' sound commercial experience in systems analysis and programming and should have a particular interest in applying modern computer technology to a changing office environment.

The Data Processing Section's operations are based on an ICL 2904/50 Computer using JCL and is developing a network of VDU office links through 7502 terminals. This is a demanding post requiring a candidate of high calibre and with real enthusiasm.

Salary on the Administrative Scale 11 (£9,220-£11,575) (under review).

Application forms and further particulars may be obtained from the Registrar, The University, Leeds LS2 9JT, quoting reference number 119/29. Applications should be submitted as soon as possible and no later than 12th February, 1981.

Education Department

County Adviser for Computer Education

Applications are invited for this newly-established post. Successful candidates should have teaching experience in Secondary Schools and their qualifications should include some knowledge of Computers. The Adviser will be responsible for advice and support in the field of computer education, including the use of computers across the curriculum, throughout the schools and colleges of the Authority.

The Adviser will receive an essential car users' allowance. The County has a scheme of financial assistance covering removal and relocation expenses.

Application forms and further particulars may be obtained from the Director of Education, County Offices, Heddon, Derbyshire DE4 3AG, to whom completed forms should be returned by February 13, 1981.

DERBYSHIRE
County Council

ROCHFORD DISTRICT COUNCIL

COMPUTER MANAGER

The Council has agreed to set up its own Computing Centre.

Applications are invited for the above post which is likely to command a salary of £13,000 - attractive benefits.

Applications are required by 6th February, 1981. Further details obtainable from: Arthur G. Cobbs, IFA, FRVA, Chief Executive, Rochford District Council, South Street, Rochford, Essex SS4 1BW. Tel: Southend 543355. Ext. 280.

South Eastern Health Board

SYSTEMS ANALYST GRADE VI

LOCATION: Kilkenny City (Ireland)

At least two years in a data processing environment, including some programming and supervisory experience, together with experience of systems analysis and design, including the successful implementation of at least one project.

SALARY SCALE: £10,357 - £14,110 (annual increments of £1,250 per annum)

Application form and particulars are available from: The Personnel Officer, South Eastern Health Board, Head Office, Leaden, Dublin Road, Kilkenny, Ireland, to whom applications should be submitted not later than 5.00 p.m. on Monday, February 16, 1981.

OVERSEAS VIA I.A.

SYSTEMS PROGRAMMER required to work on an IBM 4341 running under OS/VS1 using CICS, VSAM, VTAM etc. The work will involve general maintenance of the system, housekeeping and file maintenance. Knowledge of the Dutch language advantageous. Location: The Netherlands

ANALYST/PROGRAMMER required to program in ASSEMBLER on MINI hardware. Work involves the development of scientific X-ray application systems. Location: The Netherlands

SENIOR SYSTEMS ANALYST/PROGRAMMER required with a good knowledge of OLI and COBOL. Hardware in use IBM 4341 running under OS/VS1 and CICS. Knowledge of the IBM package COPPLIS advantageous, not essential. Applications to be worked on include an on-line production/inventory control system and other materials management modules. Location: The Netherlands

MINIMICRO specialist required to write USER REFERENCE MANUALS for a new range of MICRO's being developed. Location: Vienna

SYSTEMS SOFTWARE ENGINEER required with an in depth IBM UTILITIES knowledge to work on an IBM 4341 running under OS/VS1 using CICS, MVS, TSO, VTAM, MVS etc. Location: France, good knowledge of the French language essential

SENIOR COBOL PROGRAMMER with program design experience in business applications to work on a new dedicated machine. Small business computer experience essential. Location: The Netherlands

ANALYST PROGRAMMERS and TEAM LEADERS with excellent COBOL, are required to work on the conversion of a number of systems to IBM hardware. Other O.P. languages required are RPG II, FORTRAN and ASSEMBLER. Applications range over scientific, engineering and petro-chemical subjects. An in-depth knowledge of any of the following IBM UTILITIES will be advantageous: CME, TSO, VSAM, VTAM and FOURMOST. Location: The Netherlands

ANALYST PROGRAMMERS with experience of REAL-TIME TELEPHONE SWITCHING software. Location: Paris

TECHNICAL AUTHORS/TRANSLATORS with a basic electronics knowledge and/or digital M.O.O. systems experience to write and translate documentation from French to English or German to English. Some wire-guided missile or optics experience preferable. Location: Paris

Outlined above is a selection of current requirements. Space and time make it impossible to list all the opportunities available. Therefore, if you would like to work overseas and for a highly-respected service because I may well already have an excellent opportunity to offer you. PLEASE WRITE OR TELEPHONE NOW

Ann Arledge, Marketing and Recruitment Director
Industrial Artists Limited, 21 Sencroft, Hiltolin, Hert. Tel: (0482) 67141 (Day) or (0482) 700701 (Even/Weekends)
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UNIVERSITY OF GLASGOW

Department of Computing Science

LECTURER IN COMPUTING SCIENCE

Applications are invited for a Lectureship in Computing Science, commencing from October 1, 1981. The Lectureship is in any branch of Computing Science.

Applicants should preferably possess a good honours degree in Computing Science with a research degree as well. Applications will also be considered from persons whose first degree was in another subject but whose research degree had a substantial computing element and who wish to enter the Computing Science field.

Salary will be within the range £2005-£2085 of the Lecturers' scale of £2505-£1575, with placement according to age, qualifications and experience.

Further particulars may be obtained from the Secretary of the University of Glasgow, Room 10, University of Glasgow, Glasgow, G12 8QQ, with whom applications should be sent, giving the name and address of three referees, should be received on or before February 27, 1981.

In reply please quote Ref. No. 4785.

COMPUTER WEEKLY

Two Software Reporters £7,750 and £6,375

tax-free reading allowance (£250 p.a. in each case) (salaries due for review on April 1)

Britain's biggest computer newspaper needs two specialists to strengthen its software coverage and write general news stories.

Applicants should either:

have programming experience and be confident of their ability to write quickly and succinctly for an expert readership; or

have a background in journalism which allows them to report and analyse developments in the software industry, its products and languages.

One of the positions, depending on the candidate appointed, will take over a regular report written for programmers and concerned with all facets of their working life.

Both will involve a wide variety of news reporting on developments within software and in the computer industry generally.

The two vacancies represent a major opportunity in computer journalism on the biggest and most respected publication in the field. With a circulation of over 94,000 Computer Weekly is one of the leading titles of IPC Business Press, the world's largest publisher of specialist and trade journals.

The job is based at the company's new headquarters in Sutton, Surrey, and offers the usual large company benefits.

Write to the Editor explaining why you believe you have the skills for one of these openings and enclose a full cv and salary history. Mark the envelope 'confidential' and send to:
The Editor, Computer Weekly,
IPC Business Press, Quadrant House,
The Quadrant, Sutton, Surrey SM2 5AS

MYRIAD

A FUTURE IN C³ SYSTEM DESIGNERS/ANALYSTS

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TO £10,000

Command, Control and Communication Systems embrace some of the most sophisticated technologies available today. Our client, a member of a highly successful British group, specialises in this field and now offers several exciting and exacting positions to creative System Engineers/Designers/Analysts who have experience either of C³ or related technical projects.

You will be involved in:

- ★ System definition
- ★ Scenario building
- ★ Detailed specification
- ★ Networks design

You should offer one, or more, of:

- ★ C³ Architecture
- ★ Technical/Operational system design
- ★ Avionics/EW/RF Systems
- ★ Communications/Network Architectures

Situated between the M3 and M4 motorways travelling is easy from most parts of Berkshire, Hampshire, Surrey, Middlesex, Buckinghamshire and South Oxfordshire. The company offers excellent conditions of employment including twenty-six days' annual leave, comprehensive relocation expenses where appropriate and real career development within a rapidly expanding organisation. To discuss the scope of these positions in detail telephone the number below. Alternatively send your C.V. quoting reference SW1/2901/CW and we will then contact you.

SYSTEMS ANALYSTS

CITY

TO £11,000

This is an exciting opportunity for experienced Systems Analysts to effect an important career move.

Our client, located in the City, is seeking to expand its range of projects under development by recruiting additional systems staff.

If you can offer:

- 2 years' plus experience
- Involvement in at least one project
- The potential for project leadership

Our client can offer:

- A stimulating and highly professional environment
- Excellent career progression
- Extensive development work using advanced techniques
- Starting salary to £11,000 + good benefits

Our client will also consider Analyst/Programmers who wish to move into a full systems analysis role.

Ref: E1/2901

JUNIOR BUSINESS ANALYSTS

CITY

£7500-£9000

A major international organisation is urgently seeking to appoint an additional two ambitious and self-motivated people following the expansion of its City office.

Applicants will be interested in business matters; keen to develop management skills in a position offering job satisfaction, high rewards and the opportunity of developing personality and expertise in the Computer Industry. Dealing with people, developing relationships and understanding client requirements will be a major aspect of the work, involving communications and computing skills.

Under 27 years of age you should be well educated with either programming or analysis experience gained in a commercial environment. In addition to a confident and outward going personality the ability to work on your own initiative is a key requirement and the potential to grow with the company is of prime importance.

These positions offer a first-year salary in the range £7500-£9000 and substantially higher rewards will be achievable following comprehensive training during the first year of appointment. The Company offers a professional approach to computing issues resulting in a high competitive spirit and united commitment to growth.

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Ref: S1/2901

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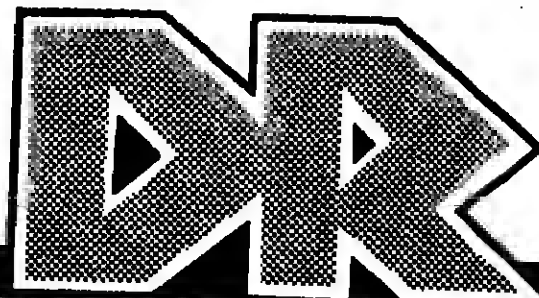
SYSTEMS ANALYSTS
£6500 to
£10500

PROGRAMMERS
£5500 to
£8500

Contact: North and Midlands
CATHY SCOTT.
Telephone: 0423 55311

Contact: Scotland
IRENE WEBSTER
Telephone: 041-226 4912

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Interested - then send yourself to us by writing, enclosing a resume of your achievements to:

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The Yankee Group
Regent House, Lower Road
Chorleywood, Hemel Hempstead
Hertfordshire WD3 8LD
Telephone: Chorleywood (0278) 4714
(4260)

RESEARCH ASSISTANT

Applications are invited for this post on an SRC funded project, directed by Dr. J. Derrington, developing techniques for program specification and transformation. Applicants should preferably have PhD in Computing Science and an interest in one or more of the following areas: Functional Languages, Compilers, Program Transformation, Programming Environments.

The appointment is for three years, to begin as soon as possible, at a salary in the range £4,700-£5,200 plus 1987 London Allowance.

Further details from or applications to Dr. J. Derrington, Department of Computing, Imperial College, 180 Queen's Gate, London SW7 2BZ. Tel: 01-856 9111, Ext. 2701.

PROGRAMMER REQUIRED

Minimum one year basic Pascal-Fortran experience. Knowledge of accounting systems useful. Salary £4,000-£5,000 neg. Tel. M.C.C. LTD. Egham (0784) 37433/4 (4221)

Self-motivated Assembler Programmer/Analyst Start here

for European and Stateside travel to £10,500 + car Self-motivated people who have the abilities required for small companies in large environments are a rarity. Invariably they cannot offer the balance between solid and effective programming skills for mini and micro applications whilst being able to handle themselves in client situations, probably in strange surroundings. As a result, we have been retained by our client to introduce to them, candidates from this rare breed.

The company, formed 6 years ago, offers full European software support to a major OCR manufacturer, and are successfully marketing 8080 based data entry and commercial micro systems. This exciting opportunity to take responsibilities for implementation and design is backed by a generous compensation package including a car. To continue your interest, please contact Capp Associates quoting reference CW 100-IF for immediate attention.

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New Technology is just History in this Company

Our client is one of the largest independent software and systems services companies in the world - a company which has a long history of involvement in some of the most innovative and important systems ever developed. Indeed, some of the British company's achievements are well known both inside and outside of the computer industry, providing benchmarks for successive development projects undertaken by other organisations.

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The increase in business now concluded for 1981 and beyond, is in stark contrast to the lack of growth currently being experienced by some areas of the computer services industry. The immediate result is that the number of professional staff will be substantially increased, since the new business will provide on-going project work for successful candidates.

Salaries

£10,500-£13,500 range, although a few more senior positions are available. Naturally, additional benefits such as a pension scheme, free BUPA, interest free season ticket loans etc also apply.

Location

The Company H.Q. is in the West End of London, so although most appointees may be working on site in the N.W. Home Counties for most of the time all candidates must be prepared to work in London. Full relocation expenses will be available if necessary.

Career Prospects

In view of the growth factor and the way in which our clients assign staff to project work, there is no doubt that there will be progressively more room for extremely senior consultancy and project management positions as time passes. Additionally, our clients approach to project control and system design is entirely modern and exposure to these methodologies is certain to enhance and increase individual professional capabilities.

Systems Analysts

These positions equate more readily to "Senior Analysts" positions in general and would therefore be suitable either for individuals already at Senior Analyst level looking for a move to consultancy work or for individuals who feel they are ready for promotion.

- Essential expertise must be thorough experience of establishing and defining user requirements.
- First-class communicative skills, both oral and written, will naturally be expected from all candidates.
- Knowledge of modern analytical methods, such as data analysis, would be a major asset although not a prerequisite.
- Machine and software backgrounds are not relevant at this stage but experience of on-line systems is absolutely essential - preferably for large multi-user and multi-site systems.

Contact: Andy Wright or Mike Creamer

Systems Designers

(incl. Comms & Software)

A broad range of skill requirements exists within various design teams, providing opportunities both for designers with a leaning towards software and for Analyst/Programmers who have not moved into pure analysis roles.

The technical areas of particular interest are:-

- Communications Systems Design - including message switching, voice network, traffic pattern and work load pattern establishment etc.
- Software Design and Programming - development work on both operating systems and communications interfaces.
- On-line Systems Design - experience of man/machine interfacing and terminal based systems is essential.
- Database and DBMS Design - knowledge of how a vast amount of information can be structured, processed and distributed.

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Just seven years, that's all it's taken for Systime to become Britain's No. 1 manufacturer of interactive business systems in the fiercely competitive computer industry - that's some track record.

We're looking for top sales executives who can live with the pace and help maintain our No. 1 position.

On target earnings £20K

Ideally with experience in selling computers, although a proven track record in selling interactive

business equipment would be acceptable. A basic salary plus generous commission based £20K on target. Many of our sales executives for more. Big company benefits apply including good company car.

For details contact
Steve Williams on Leeds 702211
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432 Queensbury Road Leeds LS1

number one

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Cornwall Education Committee
CORNWALL TECHNICAL COLLEGE, REDRUTH
PRINCIPAL: Dr. K. Farnell
CORNWALL MICRO-ELECTRONICS CENTRE

Applications are invited from suitably qualified persons for the post of:

Senior Lecturer in Micro-Electronics

This is a senior post covering all aspects of micro-electronics of a broad front, ranging from the engineering aspects of system design to software development in the fields of Data Processing and Control Engineering.

The successful applicant will be expected to be well qualified, particularly in electronic engineering, and have had significant 'hands-on' experience of modern micro-processor based systems.

SALARY: SENIOR LECTURER:
£9,962-£10,439 (per) - £11,295

Further details and application forms may be obtained from the Principal to whom completed forms should be returned within three weeks of the appearance of this advertisement. S.A.C. please.

Cornwall

PERMANENT

ANALYST/PROG. Attractive opportunity for self-starter with sound commercial systems exp. and fluent COROL or BASIC. For small expanding GEN. Central London. Ref. 61/78

PROGRAMMERS: Financial Information services + 2 years' exp. BAL or PL/1. City. Ref. 61/20

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PROJECT LEADER: For customer technical support. 4-6 years' BASIC essential. DEC and Banking exp. desirable. £8,000-£9,500. Central London. Ref. 61/22

ASST. D.P.M. Exp. Analyst/Prog. with Banking exp. £10,000-£10,800. City. Ref. 61/23

OPS SUPVR: Exp. Senior Ops. with supervisory exp. S/34 or DEC. City. Ref. 61/24

CONTRACT
SYSTEMS PROG. IBM Airline Control Program. exp. 3-6 months. London. Ref. 61/25

70 Borough High Street, London SE1 1XF
Tel: 01-403 3456 1588 24-Hour Answerphone (6584)

THURSDAY
5th FEBRUARY
**COMPUTER ENGINEERS
TEST & REPAIR**
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Shortlands, Hammersmith, W6
(12 noon-8 pm)
or telephone Paul Rasmussen NOW
01-572 0933 **PRIME**

MILITARY/SCIENTIFIC Analyst/Programmers and Programmers, Fortran/Cobol/Assembler on minis required by London-based Systems House for European and UK assignments on scientific and military contracts. Mobility essential. £7.5-10K	COMMS NETWORKS Analysts (3-5 years' in TP or on-line environment) sought for new networking/comms projects in Bucks and Central London. Of particular interest: message switching, access controls, user definitions, etc. £8-13K	PL/I HOLLAND Programmers & Analyst/Programmers with 3+ years' PL/I, ideally with some TP and DB knowledge required by Administrative headquarters of leading oil company in the Netherlands. £12-16K
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COBOL IBM & HP Analyst/Programmers, 2+ years' in commercial environment and COBOL programming on IBM 370/4300 or HP equipment, required for Commercial Systems Group of Major Oil Company at their West House, London base but initial term overseas (c. one year). Excellent overseas allowances. £8-11.5K	SYS. DESIGNERS COMMERCIAL Senior Systems Designers with 5 or more years' experience in the design and implementation of large on-line commercial systems (IBM) plus specialist knowledge of IMS needed by British Software House, London base but initial term overseas (c. one year). Excellent overseas allowances. £9-11K
---	--

DATA BASE SPECIALIST Data Analysts — IMS specialists who have experience in systems design and implementation required to fill technical specialist role and applications consultant positions at advanced User Installation in Here. c £13K	PROCESS CONTROL Programmers and Analysts with 3+ years' mini or micro Assembler (DEC in particular) experience plus relevant (i.e. scientific) degree required for producer of Industrial Control and Automation Systems, Offices in Here. £7-10K	SOFTWARE ENGINEER Hardware and Software specialists with good micro knowledge required by Micro Manufacturer to provide software implementation and support service from London base. Wide-ranging applications. c £10K
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HOLLAND GERMANY Analysts, Designers and Programmers with real-time control experience on minis or micros (Assembler level), wanted to join European branches of Systems House specialising in the automation field. Generous relocation, some positions offering car. £13-18K	MIDDX COBOL Programmers, Analysts and Team Leaders with COBOL experience and, ideally, some knowledge of structured programming techniques required to meet expansion plans for development centre of leading manufacturer. Degree preferred. Commercial/financial applications experience necessary. to £10K
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Computer Service Engineer SAUDI ARABIA

Saudi American Bank, an affiliate of Citibank N.A., is currently undergoing a large-scale expansion of its on-line real time data processing facilities. A computer service engineer is required to assist the resident senior engineer in the maintenance of main frame and terminal equipment. The successful candidate must possess HNC or equivalent or minimum 3 years' experience in a similar position. The position is based in Riyadh, but travel to installations throughout the Kingdom of Saudi Arabia will be required. The successful candidate will be offered:

- An attractive tax-free salary.
- Free furnished accommodation.
- One month's paid leave each year with paid airfare for family members to UK or equivalent.
- An additional one week's paid leave each year with paid airfare for all family members to Athens or equivalent.
- Plus other attractive fringe benefits.

The selected candidate will be offered a good package which will be subject to contract. Applications with CVs should be addressed to: Mr D.T. Faruqi, c/o Saudi American Bank, P.O. Box 833, Riyadh, Saudi Arabia.

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Saudi American Bank

SHAPE TECHNICAL CENTRE THE HAGUE (HOLLAND)

SHAPE Technical Centre — a NATO Research Organisation — has a vacancy for a

SENIOR SYSTEM PROGRAMMER

INITIAL SALARY DG.37,125
NET PER ANNUM

for its Control Data Cyber 740 computer system. The successful candidate should have broad experience in data processing with at least three years in systems programming for a CDC Cyber/6000 computer system.

Good knowledge of programming in high-level languages and macro-assembler at the operating system level is required.

Starting salaries will depend on qualifications and experience and may be increased dependent on the family situation.

Applicants (NATO nationals only) should send a brief personal résumé to Personnel Officer, SHAPE Technical Centre, P.O. Box 174, 2501 CD The Hague, The Netherlands.

(4207)

IBM MVS SYSTEMS PROGRAMMERS

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DOS/VS/E c. £13K SYSTEMS PROGRAMMERS

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We at Independent Software Support require in-house Systems Programmers for our expanding support Group.

You will have about 3 years' DOS/VS, DOS/VSE experience and be looking for a more rewarding and challenging future.

The benefits are excellent and include some international travel.

Assembler Programmers with 1-2 years' experience, c. £7K.

Chief Technical Programmer, £12-£13K. Must be able to lead up and motivate small team.

Senior Programmer, PL1 Assembler, £7K neg.

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Senior Programmer, IBM, Cobol, CICS, good prospects for advancement within company, £8K.

For more information please get in touch with Sam at 01-432-4704 or write to: Independent Software Support (UK Division), 217/218 Tottenham Court Road, London, W1P 0AP.

(4208)

PROGRAMMERS

Must have COBOL DL1 experience. CICS an asset. To suit Feb./March 1981.

Programmers, exp. RSK 11M and Corel or Macro 11 gained in a commercial environment or good PL1 exp. required.

Please contact: Daphne Jones

FORCE 8
Computer services
8 Mint Walk, Croydon. 01-680 3761

POLYTECHNIC OF THE SOUTH BANK
Department of Mathematical Sciences and Computing

PRINCIPAL LECTURER IN COMPUTING

(Ref. X12)

LECTURER II/SENIOR LECTURER IN COMPUTING

(Ref. X13)

AND TEMPORARY LECTURER II IN COMPUTING

(Ref. X14)

A Principal Lecturer is required for April, 1981, and Lecturer II/Senior Lecturer for September, 1981, to teach Computing in the Department of Mathematical Sciences and Computing. This is a lively department, able to offer excellent career opportunities in most areas of the subject. It provides a range of professional Certificate Studies courses at both undergraduate and postgraduate levels, and is currently expanding into Computer Education. It is strongly associated with the Microcomputer Advisory Centre for the Polytechnic.

The Principal Lecturer is required in order to oversee course development and encourage research and consultancy work. A higher degree in Computing is essential. Career opportunities in most areas of the subject. It provides a range of professional Certificate Studies courses at both undergraduate and postgraduate levels, and is currently expanding into Computer Education. It is strongly associated with the Microcomputer Advisory Centre for the Polytechnic.

The Temporary Lecturer II is required as soon as possible, the appointment terminating on August 31, 1981. The position would involve teaching Computing and related subjects. A higher degree in Computing is essential. Career opportunities in most areas of the subject. It provides a range of professional Certificate Studies courses at both undergraduate and postgraduate levels, and is currently expanding into Computer Education. It is strongly associated with the Microcomputer Advisory Centre for the Polytechnic.

Candidates should possess a degree in Computing or a related subject which includes Programming. Teaching experience is desirable but not essential.

The Temporary Lecturer II is required as soon as possible, the appointment terminating on August 31, 1981. The position would involve teaching Computing and related subjects. A higher degree in Computing is essential. Career opportunities in most areas of the subject. It provides a range of professional Certificate Studies courses at both undergraduate and postgraduate levels, and is currently expanding into Computer Education. It is strongly associated with the Microcomputer Advisory Centre for the Polytechnic.

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Candidates should possess a degree in Computing or a related subject which includes Programming. Teaching experience is desirable but not essential.

SOS.....DOS/VS.....West London

Super Opportunity for Supervisor, Shift Leader and Operator

to strengthen the existing operations team of a major West London Installation

A two megabyte IBM 3031, running under DOS/VS and POWER/VS is utilised, but software will be upgraded to DOS/VSE and VM in the near future. Database facilities are provided by DL/1 and the teleprocessing system runs under CICS.

Salaries offered are competitive, conditions of employment are excellent and the benefits package is most attractive.

Operations Supervisor to £9,500

Responsible to the operations manager for the control of operations, support and job control departments, consisting of approximately 20 staff. An in-depth knowledge of DOS/VS and CICS is required plus previous operations supervisory experience. Training in VSE and VM will be provided.

This is a key role requiring a high degree of management skills complemented by a strong technical background.

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(4228)



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SYSTEMS AND PROGRAMMING

CITY ANALYST (BANKING) c. £11,000

One of the most successful Merchant Banks in the City is looking for a SYSTEMS ANALYST to join a steadily expanding department. Development of systems for new areas of banking operations has created the need for a person with at least 2 years' experience in Analysis who is a good communicator and has a background which includes, ideally, some ORGANISATION AND METHODS. The usual BANKING FRINGE BENEFITS will apply. Ref: R3200

MIDDLESEX RPGII PROGRAMMER/ANALYST c. £9,000

A well-known multi-national in the electronics field is looking for a person with around 18 months-2 years' RPGII experience. The experience will have been gained in an IBM environment as our clients are major users and include SYSTEM 3, 34, 370 range and also 4300 equipment. An ESSENTIAL qualification for the successful applicant will be substantial INVENTORY CONTROL experience. Great package and EUROPEAN travel opportunity. Ref: R3175

MIDDLESEX SENIOR ANALYST/PROGRAMMER c. £10,000

A major name in the Distributive Trades is embarking on a major overhaul and redefinition of its systems. To assist with this development they need a person with PROJECT LEADING potential. The favoured career profile will include a MINIMUM of 2 years' COBOL programming followed by ANALYSIS or TEAM LEADING in a DOS/VSE environment. An excellent opportunity. Ref: R3183

WEST END PROGRAMMER/ANALYSTS £6-11,000

A distinguished OIL COMPANY with offices in the West End need a number of Programmer/Analysts to assist with new developments. Self-motivated candidates with a good NUMERATE DEGREE and FORTRAN programming experience are invited to apply. A knowledge of OPERATIONS RESEARCH techniques gained in an IBM environment would be particularly advantageous. Ref: R3188

ICL 1900/2900 OPERATOR c. £6,000 +

A well-known company in West London have a requirement for an Operator for their site which comprises both ICL 1900 and 2900 hardware. The necessary prerequisites are a very good knowledge of both GIs and VME/B. The company provides excellent opportunities for career advancement and further training together with very good staff benefits. Ref: R3180

Targa are always pleased to hear from experienced Systems, Programming or Operations staff. If your career needs a boost, contact the office for an informal discussion with one of our consultants.

TARGA COMPUTER SERVICES
6 Liverpool Street, London, EC2M 7NH - 01-283 9941

TEXACO

MVS Systems Programmer

Texaco Limited plans to convert its 2 x 4341 systems from DOS/VSE to MVS. The feasibility study will start very soon and implementation should commence mid-1981. The complete process is expected to take two years: one to plan and create the operating system, and one to convert the applications.

We therefore need one experienced MVS person to join our team of five, who with the support of consultants' staff will be responsible first for planning and setting up the new system, and then for keeping it working smoothly and at an advanced technical level.

The job will be important, interesting and challenging. Salary, depending on experience, will be in the range £8000 to £12000, plus the usual Texaco fringe benefits.

If you are interested, please contact:
Mr R. Stonehouse,
Manager, Technical Support,
Texaco Limited.

1 Knightsbridge Green, London SW1X 7QJ
Telephone: 01-584 5000.

UNIVERSITY OF SOUTHAMPTON NUMERICAL ANALYST

Applications are invited for the post of Numerical Analyst within the University's Computing Service. The successful applicant will give a supporting advisory service to computer users in numerical methods as applied to the fields of engineering and applied science, and in the techniques of mathematical modelling.

The University has access to very powerful computing facilities and a wide range of different machine architectures. The applicant will be expected to give advice on the suitability of different numerical methods for the various computer systems available. He/she will be especially concerned with the exploitation of new machine architectures such as vector and array processors.

Applicants should normally possess a post-graduate qualification in numerical methods or a first degree with a large content of numerical analysis. Experience of the application of numerical techniques to practical problems is highly desirable.

Salary will be within Range 1B/1M £4,788-£9,556 p.a. Starting point, according to qualifications and experience. Applications to be sent, giving date of birth, curriculum vitae and the names and addresses of two referees should be sent to: Mrs. P. Vaughan-Smith, Computing Department, The University of Southampton SO9 5NH, from whom further details can be obtained. Please quote Ref. 1770A/CW.

BOX NOS.

Box number should be addressed to:
Box 100
P.O. Box 100
Dorset House
Blindfold Road
London E2 8JL

CHILTERN'S

WORK ON NEW SYSTEMS IN A PLEASANT AREA, USING THE LATEST HARDWARE AND SOFTWARE

Our clients are expanding their DP services to cope with the development of major new systems and the installation of a modern mainframe. Database, on-line and financial modelling techniques are used, and remote minis with communications links are planned. We have been retained to recruit for the following posts:

PROJECT LEADER £9,000-£10,500

Sound commercial analysis experience (probably over five years) and good leadership qualities are required, ideally with knowledge of database and communications. (Ref. 328CW)

SYSTEMS ANALYST £7,500-£8,500

This will interest analysts with upwards of two years' solid experience of commercial and accounting systems, ideally including some financial modelling. (Ref. 329CW)

PROGRAMMER £6,500-£7,500

The requirement is for at least two years' COBOL, on any hardware, ideally including mainframe on-line applications. (Ref. 330CW)

Working conditions are first-class (purpose-built computer centre), and career prospects in a successful, thriving organisation are good. There are valuable fringe benefits, and in certain circumstances generous relocation expenses will be offered.

Please ring us in confidence for an initial talk, quoting the appropriate reference, or leave a message on our answering machine after hours and we'll contact you.

EDP SYSTEMS 01.63 5796
52-53 Margaret St. London W1N 7FF

PROGRAMMER? BECOME A TECHNICAL CONSULTANT LOOK WHAT IT TAKES!

THE PERSON 2-3 years' experience of commercial application programming in DEC BASIC + under RSTS/E and the ability to liaise with clients.
THE JOB Converting functional systems design to computer systems design, implementing tailor made customer systems, and adapting standard packages to users requirements.
THE REWARD A top salary, a swift and clear promotion path within a respected and established multi-million turnover group based in London but with provincial offices. Big company perks and travel and accommodation allowances when working away, plus many other benefits.

COBOL PROGRAMMERS? PROGRESS NOW TO SENIOR PROGRAMMER

THE PERSON 3-5 years' experience of on-line IBM COBOL using VSAM and CICS, the ability to control a team of 3-4 programmers.
THE JOB Developing a new on-line foreign exchange system for a major bank in the City. An understanding of FSD and the ability to produce first class program specs is essential.
THE REWARDS £10-11k per annum plus non-contributory pension, life insurance, BUPA. Beneficial mortgage scheme, LVs, bonus and recreational, holiday and sporting facilities.

YOU KNOW WHAT YOU ARE WE KNOW WHAT YOU CAN BECOME

If you feel you would be a suitable candidate for any of these opportunities, don't hesitate, contact Julie Jackson now on 01-734 9723 (Reverse charges if outside 01) and quote reference J110120.

VCS Vantage Computer Services Ltd
6 Poland Street, London W1V 3DG Telephone: 01-734 9723
Licence No. SEJA4928, Employment Agencies Act 1973.

Charles Barker Confidential Reply Service

Please send full career details and list separately companies to which we should not forward your reply. Write the reference number on the envelope and post to our London office, 30 Parkington Street, London EC4A 3EA.

Senior Systems Analyst/Programmer

London North East/Borders of Essex
Salary from around £8,000

Our Client is seeking a Senior Systems Analyst/Programmer, who will report to the Data Processing Manager.

Duties will involve the provision of technical knowledge for all in-house computer systems, analysis and programming of minor systems changes, and assisting with the extension or replacement of current systems as necessary.

Applicants are invited from those experienced in Cobol RPG programming and who are conversant with IBM Model 34. Candidates must have had some formal training, at least one year's systems analysis experience and a minimum of three years' programming experience. Some experience of application within the insurance/brokerage environment would be an advantage.

Ref: 1693 (422)

Senior ATE Programmer

SALARY c. £10,000

IAL is a major name in the data communications field, developing advanced microprocessor systems to the highest standards. The Quality Control department now needs to appoint a Senior ATE Programmer. You will be required to liaise at all levels, both within the company and with clients. For this, you must have a thorough knowledge of digital and analogue systems, experience with ATE and understanding of telecommunication principles. A minimum of 4 years' experience in electronics, backed with an HNC, or equivalent, is essential. If you have a background in the RFLP electronics field, it would be a distinct advantage.

IAL Benefits include 4 weeks' holiday plus bonus, staff restaurant, social club, pension scheme and life assurance. Salary is dependent upon qualifications and experience and relocation expenses will be paid where necessary.

Please apply quoting ref. number K/014 to Sue Dillon, IAL, Aeradio House, Hayes Road, Southall, Middx. Tel: 01-524 5134.



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JBA

Systems Designers

London based up to £15,000

Experienced Systems Designers are required immediately by our client, a leading computer consultancy, to take a key role in the design of a large real-time communications system.

Applicants should have at least six years in the design of mainframe applications and be capable of selecting hardware/software/packages for inclusion in a system. Direct involvement with database (DBMS), graphics or communications would be an asset. Excellent salaries according to experience. Contact: Jim Baker

Designers and Consultants

Surry c. £13k + Benefits

A newly founded systems company, specialising in information security products and services, require top level professionals already involved at the forefront of advanced computer and communications technology.

As a senior member of a project team, you will be developing: MICRO BASED SYSTEMS, TRANSACTION PROCESSING SYSTEMS, SECURE DATA BASE AND NETWORK SYSTEMS and working on PATTERN RECOGNITION and IMAGE PROCESSING. Knowledge of RSX11M, Assembler, PASCAL and the Z80 micro are some of the qualities sought.

An attractive benefits package supports the excellent salary. Contact: Brian Postle

Senior Analyst/Programmer

City £9,500 - £12,000

The Management Services Department of this International bank wish to appoint an experienced Analyst/Programmer to help develop and implement new banking systems for use throughout the world. Candidates must be well educated, have a sound programming background and proven analytical skills, preferably gained in a financial environment. Knowledge of IBM System 34 and RPGII would be a distinct advantage. A good salary is coupled with all the usual banking benefits. Contact: Isobel Bruce

Analyst/Programmers

London up to £11,000

We have been retained by an International energy company to recruit experienced Analyst/Programmers to join their Commercial Systems Group specialising in the development of business related computer systems on the IBM 4341 and HP3000 minicomputers.

Ideally applicants should be graduates although 'A' level education qualifications will be accepted. Successful candidates should have a minimum of two years' experience in commercial applications together with at least one year's experience programming in COBOL, gained on either the IBM 370, 4300 or comparable Hewlett Packard machines. An excellent salary together with good fringe benefits complete an attractive package. Contact: David Hendry

Systems Programmer

London £9,500

This is a good opportunity to join a well established organisation who are market leaders in their field, and gain some valuable experience. A minimum of one year using MVS or OS with knowledge of some or all of the following VTAM, CICS, IDMS or RACF. Fluency in Assembler would be an advantage as would exposure to VM.

Consideration will be given to more experienced applicants and of course the salary adjusted accordingly. Contact: Janet Chivers

Senior Programmer

City £9,000

It is essential to have at least three years' experience in M/LI preferably working in a team environment and involvement to a high degree in the implementation of medium sized systems. Knowledge of CICS, IDMS and real-time systems would be a definite advantage. Excellent prospects can be offered by this International organisation who are currently involved in a major development plan, including the upgrade of hardware, to enable them to utilise the latest technology. Contact: Janet Chivers

Engineering Support Specialist

Berks c. £7,500

A leading manufacturing organisation with plants and offices throughout Europe wishes to recruit a Senior Technical Specialist to take responsibility for a new Engineering Services Group. The new function will provide Engineers and Users with local d.p. facilities using time-sharing, packages or minis from an existing network.

Candidates, preferably graduates in Computer Science, must have at least 3 years' experience in computer engineering and be competent programmers. A background of Engineering Systems/packages, modelling or understanding would obviously be an advantage. Ability to work closely with users is essential. Opportunity for travel. Contact: Jim Baker

Junior Software Technician

West London c. £6,000 + Car + O/T

Following considerable gradual expansion, our Client, a market leader in retail and internal business systems, wishes to strengthen their engineering division with a mobile software technician.

A thorough understanding of file based systems, operating systems and diagnostics are the main qualities required. This is a junior position but nevertheless an excellent opportunity to develop in a software role and move on to team leadership. Anyone already in the engineering area with a desire to move into software may also be considered. Excellent Company package. Contact: Brian Postle

JAMES BAKER ASSOCIATES,
International Personnel Consultants,
32 Savile Row, London W1
Tel: 01-439 9311

Just in time

Mini/Micro Software

E.E.C. Pkg. to £16K

Programmers, Systems Designers and Project Leaders with in-depth experience of real-time systems are urgently required to join a number of project teams in Continental Europe. (Of particular interest will be those candidates with a strong background in developing software for Communications or Process Control systems.

Whilst all applicants will be expected to be fluent in Assembly, Fortran, Algol or derivative languages, particular hardware experience is not a requirement. All positions are on a permanent basis with relocation expenses and assistance in obtaining accommodation among the benefits our clients provide.

Ref: L5/A

Jnr. Assembler & PL-1 Progs

City of London Salary to £7.5K

A renowned Financial and Investment Consortium, long established in The City, currently requires Junior Assembler and PL-1 Programmers for its recently upgraded IBM mainframe and mini-computer installation. Suitable candidates should have a minimum of one year's Assembler or PL-1 applications programming experience.

Although in certain cases IBM COBOL will be considered. Applications areas include Property and Portfolio Management, Debt and Unit Trust Investment and Stocks/Shares Up-Date. In-house training and seminar courses will form an integral part of the education programme.

Ref: L5/B

Real-Time Programmers

Central London Salary to £9K

A leading Systems House, based in Central London, is seeking to employ additional Programmers to join its young, innovative software development team. Candidates should have a degree in a relevant subject and at least two years' real-time programming experience in either FORTRAN, CORAL 66 or Assembler. Knowledge of particular hardware is not important, but

experience to mini computers, in particular DEC's PDP range, HP2100, Prime 500 or Honeywell Level 6, would be advantageous. These positions will appeal to applicants who enjoy working as a member of a small team involved in the design, coding and testing of real-time software.

Ref: L5/C

Management Consultants

City and West End Salary to £15K

Our clients have an enviable reputation as a Management Consultancy and Research Organisation. The Company is now seeking several additional Consultants and Senior Consultants. All candidates are expected to have good personal communication skills, be self-confident and highly prescient. Generally, preference will be given to graduates aged 25-34 years with

proven abilities to appreciate and identify business management and technical implementation problems. In particular, candidates with a knowledge of structured design techniques, data management, networking and VISWATA/PRESTEL applications are encouraged to apply.

Ref: L5/D

Process Control Programmers

Sth. London & Surrey Salary to £10K

A leading supplier of Industrial and Process Control Hardware and Systems Software is seeking to recruit Applications Programmers and Support Analysts for its U.K. Headquarters. All respondents must offer at least two years' experience in either Assembler or FORTRAN as a primary language whilst those with exposure to PASCAL, BASIC or COBOL will be

favourably considered. You will play a significant role in all stages of software and systems development from product planning to installation and live running. Since travel both nationally and internationally will form a significant part of the job function, mobility is an essential criterion for these positions.

Ref: L5/E

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01-373 3063



Telex: 28800

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Computer Manager (DPM) IBM System 34 Gibraltar

To specify detailed systems analysis of the requirements of Gibraltar Government, running the system and training others in RPGII. To take charge of the System 34 Computer and 3742s. Candidates should be citizens of the United Kingdom with experience in IBM System 34 Computer and RPGII. Age under 50 preferred.

Appointment for two years. Salary range £9,600-£10,500 per annum plus an allowance normally tax free in the range of £1,539-£3,618 per annum according to marital status. Gratuity 25% of basic salary.

Free family passages, subsidised accommodation, children's education allowances, etc.

For full details and application form please apply, quoting Ref: E318 and stating post concerned, and giving details of age, qualifications and experience to:



Overseas Development Administration
100, Whitehall, London SW1A 2BQ
Tel: 01-273 3000

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PROGRAMMERS/PROGRAMMER ANALYSTS

To £11,500
London, Herts., Bucks., and Middx.
We would like to hear from candidates with good experience in one of the following languages/machines: Cobol/PL/1/Basic/ALGOL/Assembler/IBM OS and DOS/VS 1370/134, 370/145, 3033, 4341, System 34-35/ICL 2800 series/PDP 11 mini/GEC mini/LE11/Wang 2200T VP. MIP & VS-0-10h 01-01 2033, 3030/280 or 2800 microprocessors. Please telephone Bernard Jones for an initial discussion and an application form or write in confidence giving full personal and career details quoting reference CW 6111.

SYSTEMS ANALYSTS
Bucks., London and Herts.
To £13,500
Several of our clients seek experienced analysts with some user defined experience and a background of extracting the right information from a variety of people.

DESIGNERS/IMPLEMENTORS
To £13,500
Our client, a contractor in the Computer Services Industry, seeks graduates with a minimum of 3 years' good real-time, on-line experience with large mainframes - preferably ICL 2800+.

SYSTEMS DESIGNERS
London and Bucks.
To £15,000 plus car
Our client, a contractor in the Computer Services Industry, seeks applicants with considerable experience in the design and implementation of computer systems. In particular of on-line systems and preferably with a knowledge of ICL 2800 series computers.

SENIOR CONSULTANTS
London
Salary Negotiable
Fast-growing company in the Computer Services Industry seeks Senior Consultants who have a wide computer applications experience and are able to deal with clients at high levels of management. Applications from candidates with previous management experience are of particular interest.

Executive Recruitment Services

Collins House,
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Tel: Hemel Hempstead (0442) 42418

**ANALYST/PROGRAMMER c. £7500 + benefits EAST LONDON**

The Barclays Unicorn Group, a leading Unit Trust and Life Assurance Company, has a vacancy arising from the expansion of its Development Team. This position will appeal to an experienced Cobol Programmer ready for a career move into Team Leadership or Systems Analysis. We use an ICL 1904S under GILL with an upgrade to a 2956 being planned. Also a large Data General Eclipse with IBM Main Memory supports 20 VDU's used for Online Data Capture and New Business Processing.

Applicants will need sound Cobol experience, a good academic background, and should be seeking the challenge of participating in our major expansion plans, on both Mini and Mainframe applications. This opportunity offers excellent prospects with starting salaries, which are subject to review from April 1981, in the range £7000 to £7500 p.a., depending on experience. The fringe benefits are substantial including Non-Contributory Pension Scheme, Staff Restaurant and Luncheon Vouchers, a Profit Sharing Scheme and also a special House Purchase Scheme. If you are interested please apply in writing to:

B. L. T. Parker Esq.,
Administration Manager,
Barclays Unicorn Group Limited
Unicorn House
252/256 Romford Road, London E7 8JB
Telephone No: 01-534 6644

BARCLAYS UNICORN GROUP

UNIVERSITY OF LONDON COMPUTER CENTRE Programmer/Analysts In User Support

The University of London Computer Centre is a national centre and provides a central service to the University of London and to Universities in the South-East and South-West of England. The Centre is currently equipped with Control Data 7600, 6600, 6400 and 6300 72 computers and supports a large communications network of remote batch and keyboard terminals. An exciting development programme is planned which will include substantial replacement of existing equipment in the early 1980s.

The User Support Group is the main interface between users and the computing services, and provides advisory, documentation, training and education services, compilers, graphics and applications packages and libraries.

A Programmer/Analyst is required to join the team currently engaged in the support of software in the graphics area. Applicants should preferably be graduates or postgraduate students with experience in graphics software systems or a degree in computer science. The position involves a high level of responsibility and will involve working closely with the graphics area. The position is a full-time position and will involve working on a permanent basis. The salary is £7,500 p.a. plus benefits. Applications should be sent to the Director of the Centre, University of London Computer Centre, Gower Street, London WC1E 6BT. The closing date for applications is 15th February 1981.

A Programmer/Analyst is required to join the team providing the support of software in the graphics area. The position involves a high level of responsibility and will involve working closely with the graphics area. The position is a full-time position and will involve working on a permanent basis. The salary is £7,500 p.a. plus benefits. Applications should be sent to the Director of the Centre, University of London Computer Centre, Gower Street, London WC1E 6BT. The closing date for applications is 15th February 1981.

Further details and application forms are available from the Assistant Director, University of London Computer Centre, Gower Street, London WC1E 6BT. Telephone 01-275 3000.

Queen Alexandra Hospital
Portsmouth**SYSTEMS ANALYST**for
School of Nursing

A senior post working with the Senior Nursing Officer on a new project to automate plans for the continuous allocation of nurse learners to clinical experience in the various areas of hospitals and community, block teaching and holidays, within the Portsmouth District; and to provide, implement and monitor these plans to meet the educational requirements of the General Nursing Council.

Skills as Systems Analyst/Programmer and an interest in Data Processing essential. Applicants should have a sound educational background, with definite evidence of numeracy ability, and be able to communicate effectively with hospital teaching staff, pupils and students.

Salary on scale £4834-£6312. Job description and application form from Personnel Officer. Closing date 16.2.1981.

Senior Auditor

ENFIELD, MIDDX. up to £11,000

The Audit Department of Eastern Gas carries out Audits throughout East Anglia and has three Sections engaged in operational, computer and contract audits on a modern systems appraisal basis. Suitable staff are given experience in all three Sections.

The Senior Auditor will be responsible for carrying out audits as a Team Leader and will be a qualified Accountant aged between 25 - 35, with at least one or two years post-qualification experience and a knowledge of modern audit philosophy and techniques. Preference will be given to candidates with data processing/systems analysis experience. Salary range £8,910 - £11,066 plus the benefits normally associated with a large progressive organisation, including where appropriate, assistance with relocation expenses.

Please write, not later than Friday 6th February 1981, quoting ref. 2553/CV, and giving full personal and career details to the Senior Recruitment Officer, Eastern Gas, Star House, Milton Lane, Potters Bar, Herts. EN6 2PD.

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Growth of 100% per annum demonstrates the high looking attitude of the major U.S. mini manufacturers in London/County to ambitious service organisation. Product training in both U.S. and Europe and early promotion will boost your career. You can demonstrate computer experience and mature skills to work.

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£7,500 + CAR + O.T. + BENEFITS
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New company has introduced unique mini based service facility from scratch. These positions offer involvement and will appeal to enthusiastic individuals able to demonstrate initiative and computer skills.

Call KEITH WALLIS for details on any of the many offers at 01-843 1840 or 01-843 1885.

ALLTRONICS PEOPLE

01-843 1840 (day)

Project ManagerNew Project and
Financial Control Systems

Surrey c. £12,000

Our client, a highly successful and reputable international company, is demonstrating its commitment to further success in the eighties and beyond by its advanced computerisation of project and financial control systems.

The Candidate

You will have had considerable experience in the design and development of computer systems. Your background may be in mainframe or minicomputers. You should have an awareness of financial, business and management information systems and an up-to-date knowledge of hardware and application packages. You will be an innovator with good personal communications skills.

The Position

Working with the financial director initially, you will analyse current manual and computerised systems. After consultation with other senior management, you will be responsible for designing total systems for the future, specifying the necessary hardware, preparing the implementation plans and managing their development.

This is a key role in the company. The successful candidate can look forward to a very attractive future. Contributory pension scheme, free or reduced BUPA, relocation assistance where necessary.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, weekdays 9.30-5.00pm (0444) 4705 or daytime as below.



Harvey Recruitment

Executive and Computing Personnel Consultants
500 Chesham House, 150 Regent Street,
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Are you a person with some experience of selling peripherals?

Or, if your background is suitable would you like a selling job in the UK's fastest growing market. If so we'll train you.

We require another person for the North of England to sell Lear Siegler video and matrix printers, and Penny & Giles magnetic drives, micro processor based data stores and floppy disc data retrieval systems. And we will support the people appointed with product training, hardware and software support, development engineering, salary, commutation and car. Interviews will be conducted in your area. Write or telephone: Tim Denslow at the address below.

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CONTRACT?

Computer services



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SENIOR ANALYST/PROGRAMMER NHS
Admin. & Clinical Grade 8

Current Salary range £7,801 to £9,268 Inc. London Weighting. Applications are invited for this post in a small team developing the integrated Hospital Computer System, based at Northwick Park Hospital. The successful applicant who will act as Deputy Project Manager, will be responsible for advising the Project Manager on software aspects of the system development as well as contributing to the design of further modules. The work will require a high degree of responsibility, initiative, enthusiasm and technical competence. Preference will be given to applicants with previous experience in Hospital computing and familiarity with CORAL 66 Programming will be an advantage.

Application form and job description from Mr R. Stevens, Staffing Officer on 01-484 5311 Ext. 2001.

Closing date 18th February 1981 (4279)

THE UNIVERSITY OF KULL

Administrative Data Processing Unit

Applications are invited for the post of

PROGRAMMER

from persons with at least two years' programming experience, preferably using COBOL. In the ICL 2803/4 environment. Experience in on-line programming techniques would be an advantage.

The post is available for a period of 2 years.

Salary scale: Range 16 for Administrative staff - £2,765-£3,008 (under review) plus USB benefits.

Applications (3 copies) giving details of age, qualifications and experience, together with the names of two referees should be sent by February 15, 1981, to the Personnel Officer, University of Hull, Hedlule 700, Humberston, Lincolnshire.

Particulars may be obtained.

(4279)

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Modus Management Services Limited
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Hertfordshire, WD7 7JL

International Personnel Consultants

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Customer & Field Service

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Current vacancies include:

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London, all areas of Home Counties, Berkshire, Midlands, South East, Wales, Hertfordshire.
- * **Mainframes**
Scotland, London, Hertfordshire, Amsterdam (predominantly IBM and large DEC machines).
- * **Peripherals**
London, all areas Home Counties, Berkshire, Hertfordshire, S. Wales (IBM orientated), Midlands.
- * **Communications**
Home Counties, London, S. Wales.

We need to know your background and requirements in order to help you - so register with us now.

Contact: Andy Wright or Mike Creamer

DO YOU UNDERSTAND COMPUTERS? CAN YOU SELL?

We are looking for sales representatives to sell our computer products. If you are a graduate with a degree in a relevant subject, we would like to hear from you. Please send your CV to: Abingdon (0235) 24295. Reason: Oxford. (Mentioned in the press.)

The AEW Nimrod real-time system.The most challenging systems project
you could ever work on.

There's nothing in the world like the real-time data processing system that's the heart of the Airborne Early Warning Nimrod.

That's fact, not opinion. The system handles all the data from one of the world's most advanced radars, from the aircraft's communication equipment and instruments, and from other sensors. It operates within the strictest definition of real-time, and to the highest standards of software integrity.

If you're becoming increasingly frustrated with designing and implementing systems that all seem to have much the same applications, come and work on the AEW Nimrod software and its associated proving facilities.

You'll be more familiar with the work than you might imagine - especially if you have a sound background in real-time systems and analysis. But the one thing you won't be familiar with is the interest and satisfaction of becoming totally involved in a major system with a totally new application.

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The team that you will lead will produce mission software to enable air

grow in the AEW Nimrod to interrogate the central AEW database and central aircraft subsystems. You will understand the customer's operational and technical requirements and will liaise with hardware and design teams. You have had leadership experience and a knowledge of CORAL 66 and real-time systems.

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You will implement mission software in a team which will provide operator facilities to air crew operating the AEW Nimrod. The software will run in the central computer and interface with both microprocessor based operator consoles and also complex electronic subsystems. You have at least 18 months' relevant experience with high level languages, preferably CORAL 66.

These are positions open only to men and women who have the relevant experience. Posts are also available in other sections for those with equivalent experience and for those employed in related fields who wish to broaden their experience.

Write giving brief details of your experience to C. Hill, Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Telephone 01-953 2030, extension 3443. Alternatively, telephone 01-207 3455 anytime. Please quote reference MA80/23.



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The London based DP Headquarters of an international group of companies is seeking an experienced IBM Operator to assume responsibility for an IBM System 34 on a days only basis within the hours of 6.00 am to 7.00 pm.

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- work days only

The successful applicant will:-

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- possess initiative and want responsibility

Reporting directly to the DPM, this position offers a great deal of personal autonomy to the right individual, and full training facilities are available to supplement existing IBM experience with any System 34 knowledge which may be required.

If you would like to hear more about this unique opportunity, contact Phil Gascoigne on 01-935 0671 (24 hour answering service), or Epsom (78) 29166 evenings and weekends (7.30-9.30 pm).

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A minimum of 5 years experience in an EDP/Business systems environment working as a Project Manager on complex multi-projects is required. You will participate in the initiation and preparation of long and intermediate term Ministry Plans for the effective use of professional staff and EDP equipment. You will also be responsible for the effective monitoring of systems to ensure adherence to the plans.

Computer Systems Analysts to £9,860

You will act as a senior member of various project teams participating in the identification and analysis of the computer systems needs and following through with the implementation of the designs and solutions developed. A minimum of 5 years experience is required as is working knowledge of ANS COBOL and JCL, preferably IBM; exposure to IMS data base technology and online systems applications would be a decided asset.

Computer Systems Managers to £11,780

A minimum of 5 years experience in complex business applications and project management is required. Specifically, you will be managing and/or co-ordinating a team of systems professionals who provide computer systems development, maintenance and production support to various branches of the Ministry. Exposure to IMS Data Base technology and online systems applications would be a decided asset.

Business Systems Analysts to £9,860

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You will provide technical support for the design, development, security and maintenance of current and future data base systems, as well as monitoring the data base operations and implementing improvements to enhance their performance. A minimum of five years in EDP at the technical level is required as well as a thorough knowledge of IBM computer hardware and the "internals" of IMS data base software and its interface with an OS MVS operating system.

Analyst/Programmers to £8,512

You will be involved in the translation of client needs into programming specifications and required to participate in the development and support of the Ministry's computer systems. Thorough knowledge of ANS COBOL and JCL (preferably IBM) is required as is a minimum of 3 years experience in complex business applications utilizing large mainframe computers; exposure to IMS data base technology and online systems applications would be a decided asset.

These are permanent, full-time positions. In addition to the excellent starting salaries, the Ministry provides an extensive package of fringe benefits including major Medical, Health, Dental and insurance plans. Attractive relocation allowances will be provided to successful applicants. These positions will be based at the Ministry's new Head Office in the city of Oshawa, a 45 minute drive from central Toronto.

*Salaries based on exchange rates as of January 16th, 1981.

Senior Ministry officials will be interviewing selected applicants in the United Kingdom commencing in March, 1981. If you meet the minimum requirements for the position you are applying for, and are interested in a career with a fresh new horizon, please submit a detailed resume including position(s) applied for, qualifications, experience and personal data to: Government of Ontario, c/o, Dept. 89, Selective Placement Service, Ontario House, 13 Charles II Street, London SW1Y 4QS.

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(4223)

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CICS or ACF/VTAM Systems Programmers Birmingham to £9.5K + Bonus

There are superb opportunities for good IBM Systems Programmers with one or more years experience of supporting either CICS or ACF/VTAM, at this large and expanding mainframe and mini site. Career prospects are increasing as our Client advances ever further into sophisticated Data Processing and Manufacturing Control Techniques, involving latest advancements in hardware and software technology.

Generous financial and personal assistance will be given to you to help you relocate comfortably and you can look forward to large company benefits and a successful career with this market leader in a very stable industry.

In the first instance, telephone me, Digby Dyke by transfer charge on 021-643 8501 between 9am and 6pm or on 06845 2210 evenings between 8pm and 11pm or anytime weekends, and I will be glad to discuss these opportunities with you.

Computer People Midlands

Alpha Tower
Birmingham B11 1T
Telephone: 021 613 8501
& Bristol 0272 292966

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Assembler Programmer

S.W. London c. £8,500 + Benefits

Our client is one of Britain's major blue-chip groups whose diversity of interests ensures their continuing success and provides a secure environment in which you can develop your career.

Their diversity demands extensive use of advanced data processing facilities which currently includes an IBM 4341 operating under DOS/VSE and numerous mini-computers.

They have an extensive development plan with an emphasis on on-line systems using CICS.

The successful candidate will enjoy a high level of user contact and be responsible for the analysis, development and implementation of a wide range of applications. As a result, he/she will gain exposure to teleprocessing and database software.

Ideally, you should have:

- a sound knowledge of IBM Assembler or equivalent language in a commercial environment
- the desire to accept a high level of responsibility and progress rapidly in a full analysis role

In addition to a negotiable salary, the company offers an attractive range of benefits.

For a full details of this opportunity, please write to: Andrew Chapman, Lloyd Chapman Associates, 125 New Bond Street, London W1A 0AB. (01-406 1670)

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SYSTEMS SUPPORT ENGINEERS

IBM-COMPATIBLE CPU's

c. £9½K PLUS CAR

We are a large multi-national group of Companies with diverse interests throughout the world. We have recently commenced marketing IBM-Compatible CPU's in the UK. Our range consists of both medium and very large mainframes, the largest of our products being more powerful than the new IBM 8081.

In order to establish this operation, we are seeking a number of Systems Support Engineers to provide pre and post sales support to our Clients in the areas of Operating Systems and Systems Software packages.

We are seeking experienced Systems Programmers or Systems Engineers with current involvement in any of the following areas:

DOS/VS, DOS/VSE, VS/1, MVS, VM

Our initial requirement is for a Systems Support Engineer with DOS/VS - DOS/VSE experience to be based in the South Midlands area with easy access to the M1 motorway. We are also seeking applicants with experience of VS/1, MVS and VM to take up similar positions in various other locations throughout the Country.

This is a very exciting and challenging period in our Company's development. In addition to providing Systems Specialists with outstanding career development prospects, we offer a salary of c. £9,500 per annum, a 1.6 litre Company car, free life insurance, free BUPA and a range of very attractive 'Big Company' benefits.

If you are seeking a chance to use your personality as well as your technical skills, contact our Advisory Consultant IAN PAYNE on 021-236 8781 (24 hours answering service) or 0827 282480 (evenings and weekends) to obtain further details.



Specialist Computer Recruitment Ltd

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Birmingham 021-236 3781/3537, Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427, Blackfriars House, The Paragon, Manchester M3 2JA
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Saudi Business Machines offers you the chance to keep at the forefront of Data Processing technology, supporting the full range of IBM equipment throughout the Kingdom, and to be involved with state of the art software. Full educational facilities will be provided to ensure that you remain out in front.

Due to the rapidly expanding market opportunities Saudi Business Machines is pursuing a long-term staffing plan and are looking to recruit:

SYSTEMS ENGINEERS

up to £22,000 tax free

CUSTOMER ENGINEERS

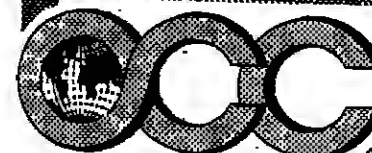
up to £17,000 tax free plus overtime opportunities and many benefits

Substantial experience of IBM hardware and/or software is essential.

In addition to attractive tax-free salaries, Saudi Business Machines, as a leading employer, offers excellent conditions which include: ● Married or single status ● Free accommodation ● Furniture loans ● Car allowance ● Free medical covers ● Indefinite term employment with career prospects ● Holiday flights to home country.

Positions are open to all nationalities, client interviews will be arranged towards the end of March.

As a first step you should contact Mika Meed immediately on 01-242 9356 or write to him at OCC Computer Personnel, 16 Bedford Row, London, WC1R 4EB, quoting reference 950/CW.



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ANALYST/PROGRAMMERS

£8,500-£11,500 p.a. RELOCATION PACKAGE AVAILABLE TO SWINDON

This major corporation is setting up a brand new European Data Centre based on an IBM 4331 network using CICS, TSO, VSA. The department's offices and computer room are literally being built at this moment. The development plan has been agreed and we now wish to recruit three rather special analyst/programmers; people with the resilience and personality to attain a high level of achievement and professionalism in their work, despite any teething problems that may occur.

The d.p. department reflects the company's dynamic, modern approach to management, giving members an opportunity to express their thoughts and accept responsibilities commensurate with their abilities. The company manufactures very high technology products and its growth over the last decade has been one of the talking points of Wall Street. Now it is a multi-million dollar corporation whose profits enable it to pay top industry salaries. Corporate personnel policies have developed a company where the average age is lower, and the average intelligence is higher than normal. The management is results oriented and the company is driving forward from success to success.

These posts represent a real opportunity to gain excellent experience in a modern IBM on-line and database installation. The department is still in its embryonic stage, consequently those capable of making a substantial practical contribution now, can in future, enjoy considerably increased salaries and responsibilities. Projects will be technically stimulating giving true job satisfaction.

QUALIFICATIONS. The only mandatory requirements are a minimum of 4 years' IBM COBOL programming and some exposure to analysis. Naturally if you have CICS, TSO and VSAM all the better. However to be successful you must have the personality that ignores job demarcation and instinctively tackles any task necessary to achieve the end result. Intelligence and good communications ability are taken as read. A good relocation package is available.

To join a first-class department, obtain an increase in salary and enjoy the quality of life associated with living in the West Country.

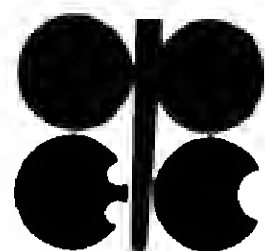
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offers experienced Data Processing professionals most challenging job opportunities in its Computer Section. Applicants are invited from candidates with basic academic qualifications up to a Technical or University Degree or equivalent professional training plus a minimum of 5 years' working experience in the computer applications field and in FORTRAN, PL-1 or Merk IV programming. Fluant English is essential.

DATA BANK ADMINISTRATOR

Profound knowledge in File Management Systems and DPMS packages is necessary. Experience in the design, implementation and operation of data banks, in the enhancement of performance and in establishing standards for operational procedures and documentation is required. The successful candidate should have implemented at least a medium-size database application using one of the major DPMS in a multi-user environment.

APPLICATION PROGRAMMER

Specific working experience in the development of D.P. applications is required; thorough practice in FORTRAN is necessary, as well as basic knowledge in operating systems, DPMS and file management systems. Educational background in methods of Operations Research and experience in large-scale modelling is welcome.

SYSTEMS PROGRAMMER

Deep knowledge of IBM operating systems (MVS/TSO, VM/OMS) and their associated hardware components. Must be familiar with installation and maintenance of software packages and a detailed knowledge of IBM assembly language, JCL and usage of interactive monitors. Knowledge of CICS and STAIRS would be an asset. Some knowledge of Digital PDP series minicomputers also welcome.

DATA BANK ANALYST

Good background and experience in developing, running and maintaining commercial information systems that handle large volumes of data. Knowledge of Merk IV very desirable. Basic knowledge of at least one major DBMS is required.

The posts are permanent and provide for tax-free salary and social benefits. Applicants are requested to send their detailed curriculum vitae including job history and salary progression as well as a recent photograph to:

OPEC
Personnel and Administration Department
Obere Donaustrasse 93, 1020 Vienna, Austria

Telecomputing

ONLINE DEVELOPMENT STAFF

SYSTEMS ANALYST/ PROJECT LEADER

- Experienced Systems Analyst with ICL COBOL programming background. Must have successfully implemented at least one major on-line system.
- Located in the West End of London, the job is with one of our clients, a major listed Property and Investment Company.
- An outstanding opportunity to be involved from the early stages in the introduction of on-line systems using TPS on a newly-installed ICL ME29. The successful applicant will be required to communicate effectively with all levels of user management and will need the technical ability to carry a complex on-line system through to implementation.
- The salary is unlikely to be a limiting factor for the right person. Our client is able to offer pleasant working conditions and a comprehensive benefits package.

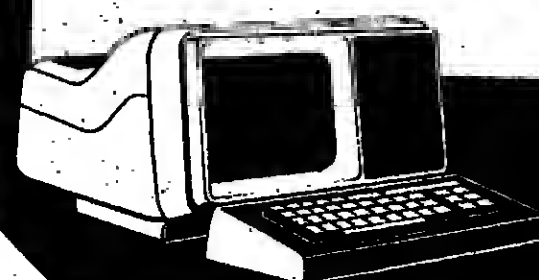
COBOL PROGRAMMER

- A minimum of 18 months' experience on ICL hardware.
- Based in Oxford or London, but may involve working at client sites throughout the UK and occasionally abroad.
- Challenging work on new on-line developments.
- As a well-established software house we are able to offer an attractive remuneration package and excellent opportunities for rapid career development.

For further information please contact:

Terry Kirk
Telecomputing Systems Ltd.
Seacourt Tower
West Way
Oxford, OX2 0ED
Tel: 0865 723621

Lance Dorman
Telecomputing Systems Ltd.
Seacourt Tower
73 High Holborn
London, WC1V 6LS
Tel: 01-404 4887



"IDEC has a lot to offer the experienced Software Professional"

"I made the right move when I joined IDEC. It has given me the opportunity to become involved in big projects and to lead a professional team."



The work is very stimulating and challenging. And it's refreshing to work with co-operative people who will listen to and value your opinions and ideas.

Computers and telecommunications make a very powerful combination, and it is an area in which IDEC is already a world leader. Our new project will take us much further.

In fact I'm looking forward to the future with IDEC."

DANIEL ERZEN - Systems Consultant

As a development centre for ITT in Europe, IDEC is an established innovator in advanced micro-processor based communications systems and associated software.

Over the next few years, there are going to be some very exciting things happening at IDEC. And that's why we're now looking to strengthen our Software Development operation by appointing a number of Software Professionals into rewarding positions within our successful, fast-moving organisation.

With IDEC, you'll become an important member of a talented team working on challenging projects which involve highly sophisticated and advanced micro-processor engineering, firmware, software and systems. You'll also enjoy the opportunity of your project involvement — the chance to stay with

your project right through from inception to completion.

In terms of rewards, you'll find IDEC hard to beat. Our salaries, conditions, training facilities and benefits are amongst the best in the business. And in our successful, fast expanding organisation, opportunities exist for rapid promotion.

So if you're an experienced Software Professional male or female looking for greater rewards, a progressive career and a fresh challenge, join Doug, Chris, Gerald and the rest of the development group at IDEC.

And start succeeding in your career. Contact Sue Downes or Chris Turner at the address below to arrange an immediate interview. IDEC - ITT, Grosvenor House, Mutton Lane, Putney Bar, Herts. Tel: Putney Bar (0707) 51199.

"I joined IDEC 18 months ago as Principal Programmer. Now I'm a Team Leader — running the team I first joined."

Individuals really matter with IDEC. You're an important member of a team where everybody makes a contribution. And it's very rewarding to work for a successful organisation, producing a successful product.

The software development work is always challenging, interesting and intellectually stimulating.

In the 18 months that I've been here my career has taken a positive direction. All round, I'm very happy with IDEC."

CHRIS HILLS - Team Leader

DOUG BRODIE - Software Development Group Leader

"IDEC is involved in exciting state-of-the-art, software development work. Some of the techniques we utilise are highly innovative. In the competitive European markets, our products are very successful. And we're well positioned to exploit the more demanding markets of the future."

That's why IDEC has a lot to offer the experienced software professional. You'll get experience of advanced real time software for micro-processors developed on IBM/Amdahl mainframes. And the new projects that are on the way are bigger, more exciting and more challenging.

IDEC is a young, informal Company where progress is based on performance. And we like to reward our people very well. In fact, looking around, there aren't many companies to beat us."

ITT-IDEC



RESEARCH ASSOCIATE

POLYTECHNIC OF THE SOUTH BANK
MICROCOMPUTING ADVISORY CENTRE

Business and/or Computing Graduate are required to work on a project concerned with the USE OF MICRO-COMPUTERS AS AN AID TO MANAGEMENT. The project is sponsored jointly by the polytechnic of the South Bank and a well-known employers' association, and will last for six months. Candidates will be expected to work closely with participants and have some experience of Business and Computing Applications.

Salary £5,708-£5,248 p.a. + London allowance £768.

Application forms from The Staffing Office, POLYTECHNIC OF THE SOUTH BANK, BOROUGH ROAD, LONDON, SE1 0AA (Telephone 01-828 8889) ext. 2023, to be returned by the 13th February, 1981.

university college of swansea

Microprocessor Centre Manager

Applications are invited for the post of Manager for the College's established Microprocessor Centre, which provides a service to the college and to industry. Applicants, male or female, should have a degree or equivalent qualification, together with appropriate experience with microprocessors. The post, which includes responsibility for the day-to-day running of the centre, liaison with users and the continuing development of the service, would be suitable for a person with demonstrable technical competence who is seeking to apply managerial skills. The salary will be on the scale £9,220-£11,575 per annum.

Communications Engineer

Applications are invited for the post of Communications Engineer in the Computer Centre. The successful applicant will join a team developing a terminal switching network in the college, and will be expected to make a major contribution to the development of computer-to-computer communications both within the college and between the college and other universities. Applicants, who should be graduates, or have equivalent qualifications, should have experience of hardware maintenance and design of computers and/or communications equipment. A knowledge of software and communications circuits would be an advantage. The appointment, which will be for a period of one year, will be on the scale £5,806-£7,585 per annum, plus 1980/81 O/S benefits. Further particulars for the above posts and application forms (2 copies) may be obtained from the Personnel Office, University of Swansea, Singleton Park, Swansea, SA2 8PP, to which office they should be returned by Friday, February 20, 1981.

ASSISTANT TO DP/WP CO-ORDINATOR

An expanding Lloyd's Insurance Broker is seeking a person of 24/25 years of age to act as an assistant to their DP/WP Co-ordinator.

The applicant must have some IBM system 3/34 operational and programming experience. Also preferably some insurance knowledge.

Salary negotiable circa £7,000.
Suitable applicant please contact:
Mrs. S. Palmer on 01-481 3904

Computer Supervisor

THE COMPANY

Aberdeen Service Company (North Sea) Limited is one of the major general service companies involved in the North Sea Oil industry. Its operations encompass the purpose-built South Bay Marine Base at Peterhead; Engineering facilities at Peterhead; the provision of specialist personnel for Offshore Platform Maintenance; Transport; Property and the supply of Bonded Goods to the Offshore industry.

THE JOB

Due to continued expansion of our data processing activity, a vacancy has arisen for a suitably qualified computer professional, reporting to the Computer Manager. The successful applicant will be responsible for controlling the day-to-day operation and supervising the computer staff. Other duties will include scheduling work; liaison with user departments; fault diagnosis and maintenance of application software and providing holiday and sick leave cover.

APPLICANTS

Applicants should have a good general education with at least two years' relevant computer programming experience.

BENEFITS

Salary and benefits will be commensurate with qualifications and experience. There is a contributory pension scheme and long life assurance. Applications should be made, in writing, to:

Mr. W. N. Guy,
Senior Personnel Manager,
Aberdeen Service Company
(North Sea) Ltd.,
Guild House, 28 Guild Street,
Aberdeen AB1 2NJ



Onshore Services for Offshore Oil

PART-TIME

COMPUTER PROGRAMMER

Person required 3 1/2 hours per day with at least 3 years' experience of Programming preferably on I.B.M. Computers, language M.C.L. Successful applicant would be writing programmes as a supplement to our full-time programmer. Please telephone for further details.

Personnel Manager
DEWHURST & PARTNER LTD.
Inverness Road, Hounslow, Middx. - 670-7781

Senior Analyst

Salary: £8,474 - £9,893 p.a.

The Authority is looking for an experienced Senior Analyst who has a relevant qualification of degree standard and preferably at least 3 years' experience in computer systems analysis.

Applications will also be considered from suitable people with less experience for appointment at the lower end of the pay range.

You will be helping to design systems to enable the Authority to carry out its functions covering the whole water supply. You will be housed in a new purpose-built computer centre situated at the Authority's head office near Warrington, with a daily I.C.T. 24/7 computer supporting an extensive communications network to divisional offices.

There is an ever-growing demand for computer systems and the development of this network and associated applications, using a variety of terminals, is under constant review.

Closing date for applications: 31st February 1981.

Applications should be sent to the Personnel and Management Services, North West Water, 12, Park Road, Warrington, Cheshire WA9 6JF.



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10, Blenheim Road, The Lansdowne Appointments Register, Park House, 207 The Vale, London W5 1SD (Tel: 01-891 5371) (24 hours answering service).

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Address _____
Occupation _____



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of higher education

SCHOOL OF MATHEMATICS, STATISTICS AND COMPUTING

Kelsterton College
Connaught Quay, Clwyd

PRINCIPAL LECTURER COMPUTING

Applications are invited for the above vacancy. The work will involve responsibility for developing a scheme for a course of studies in the Processing of Digital Level.

LECTURER I in COMPUTING

SALARY: £4882-£5045

Applications are invited from suitably qualified and experienced persons for the post of Lecturer I in Computing. The successful applicant will be expected to contribute to the development of our own postgraduate Microprocessor Centre.

Further details and application forms are available from the Institute, Kelsterton College, Connaught Quay, Clwyd. Tel: 01-891 5371. Closing date for applications: 31st February 1981.

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For the start of '81 we at Independent Software Support can offer many medium- and long-term contracts in America.

IBM

COBOL, IMS, CICS
39 PROGRAMMERS
With a minimum of 5 years' D.P. experience with 2-3 years' IMS.

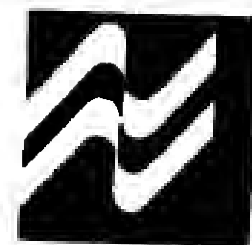
ARIZONA

HONEYWELL
15 SYSTEMS PROGRAMMERS
GOOS - GMAP Conversion
With minimum 4 years' GOOS experience.

All the positions carry high salaries and a full relocation package.

For more information please get in touch with Jean at ISS on 01-457 4764 or write to Independent Software Support, 215 Tottenham Court Road, London W1P 9AR.





National Advanced Systems

(A division of National Semiconductor UK Ltd.)

As a European market leader in IBM compatible mainframes National Advanced Systems has an enviable past and an excellent future. The company's range of hardware is size second to none in performance. Their products incorporate the latest technology and are based on experience accumulated within a group that has manufactured more plug compatibles than anyone else world-wide.

SYSTEMS SUPPORT ENGINEER

Manchester — to £15,000 + Car

You will be responsible for pre- and post-sales support including diagnostic analysis and guidance regarding the planning, maintenance and tuning of clients systems. Your expertise will also be used to assist in the presentation and evaluation of company products. Applicants should have at least 2 years' involvement in large IBM systems. This will include sound knowledge of both operating and systems software particularly MVS and SNA/VTAM. A broad knowledge of major software products e.g. IMS, CICS would be advantageous.

For further information and initial interview please contact HUGH MACER on 01-629 7262 (reverse charges).

FIELD COMPUTER ENGINEER

London and Manchester — up to £10,500 + Car

Your responsibilities will include preventive and corrective maintenance at user sites, plus assistance with installation, commissioning and on-going support. We are looking for self-motivated engineers whose experience has been ideally gained on IBM mainframes or plug compatibles and associated peripherals. In return you will be offered a challenging environment working with 'state-of-the-art' technology, and of course, full product training which will be provided either in Germany or the U.S.A.

Computer Appointments

a division of Graduate Appointments Ltd 7, Princes Street, London W1R 7RB Tel: 01-629 7262

THE DEVELOPMENT OPPORTUNITY IN KENT FOR AMBITIOUS SYSTEMS PROGRAMMERS

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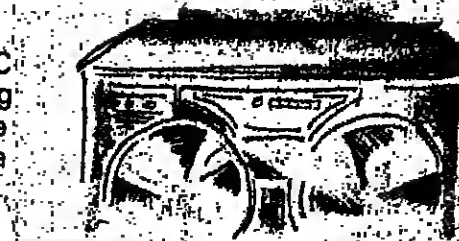
You will have a degree and at least 2 years' systems programming experience on DEC machines with a sound knowledge of ASSEMBLER. Preferably, you will have VAX operating systems experience and a wish to develop that experience on 11/780 equipment. You will be support to the engineers on the ARRAY PROCESSOR.

You will want a career in the industry of the future and the following benefits:

- A salary to £10,000
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- Very attractive surroundings
- Brand new offices
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COMPUTANT LIMITED

RECRUITMENT AGENCY

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IBM Operations Support

Great expectations...

...yours and ours. We're BL Systems Limited, and, at our Oxford location, we're looking for ambitious, capable men and women to join us in the following positions:

Operations Analyst Technical Operations Analyst Project Leader

We have an RJE work station linked to an IBM 3033 and an Amdahl V7 in Redditch. On site is an IBM 4341, used for on line work.

We've also just installed a Honeywell PPS to support batchwork, which covers such areas as finance, accounts, payroll, plant support, material and stock control.

Our expectations of you include an IBM OS-MVS, VSI, VS2 or SVS background and an understanding of JCL and utilities. A programming language would be advantageous, and the Project Leader should have some man management experience.

You, in return, can expect outstanding prospects — managerial and supervisory in systems or development — prospects which represent careers not jobs. Salaries — in a range £5.5K — £7.5K — are equally attractive, as are the benefits which include overtime, generous discount on cars and parts plus relocation assistance where necessary.

To apply, please write to Bob Davies, BL Systems Ltd, Grosvenor House, Prospect Hill, Redditch, Worcs.

What a great idea.



"If your'e interested in advanced software development, then IDEC is certainly the place to be"

GEOFF CORDINGLEY
Group Leader



"I joined IDEC three years ago as a Principal Programmer. Currently I'm heading-up an experienced group of 4 teams comprising of some 20 people.

Within IDEC there are a lot of young, highly educated and ambitious people. It makes for a very friendly, interesting and intellectually stimulating working environment.

Throughout my career with IDEC, the work has always been challenging. We've already achieved several major technical advancements and our future developments promise to present a real challenge — particularly on the technical side.

There's plenty of scope for initiative within IDEC. It's a tremendous feeling to be involved in the development stage of a project, which then becomes a major success in the market place.

IDEC has given me in-depth knowledge of several technical areas. It's also given me the opportunity to become involved in real management — something which I enjoy. And in terms of rewards with IDEC, I've certainly got no complaints.

In my opinion, if you're interested in advanced software development, then IDEC is certainly the place to be."

As a development centre for ITT in Europe, IDEC is an established innovator in advanced micro-processor based communications systems and the associated software.

Our is a fast moving organisation in a fast moving industry. And that's why we're looking for experienced and ambitious Software Professionals at all levels to join our successful operation.

With IDEC, you'll become an important member of a talented team working on a wide variety of challenging projects which will involve highly sophisticated and advanced micro-processor engineering, firmware, software and systems. In other words, you'll gain a broad based experience in the shortest possible time.

In terms of rewards, you'll find IDEC hard to beat. Our salaries, conditions, training facilities and benefits are amongst the best in the business. And in our successful, fast expanding organisation, opportunities exist for rapid promotion.

So if you're an experienced Software Professional male or female looking to develop your capabilities, further your career and reap the rewards your talent deserves, make the move to IDEC.

Like Geoff, you won't regret it. Contact Sue Dowsett or Chris Turner at the address below to arrange an immediate interview. IDEC — ITT, Orchard House, Moulton Lane, Pottery Bar, Haris. Tel: Pottery Bar (0707) 51199.

ITT — IDEC



FIRST prizewinner for January's Crossword is John Pead who is a partner in software specialists Murray, Pead of Beckenham. He wins £10. Winners of £5 are Mark Booth, a systems programmer with British Telecom's Leeds computer centre, and John Wright, systems consultant with Leicester Computer Bureau.

A HALF-DAY seminar on Computer Bureaux v Mini-Microcomputers is to be held at the London Chamber of Commerce and Industry on March 24. It is aimed at small to medium-sized companies, either as potential first-time users or at existing users contemplating change. The fee is £23 + VAT for members of LCCI and £30 + VAT for non-members. Enclose self-addressed envelope with correspondence.

Further information: Mr L.G. 39 Cannon Street, London EC4N 3AB. Tel. 01-448 1448.

